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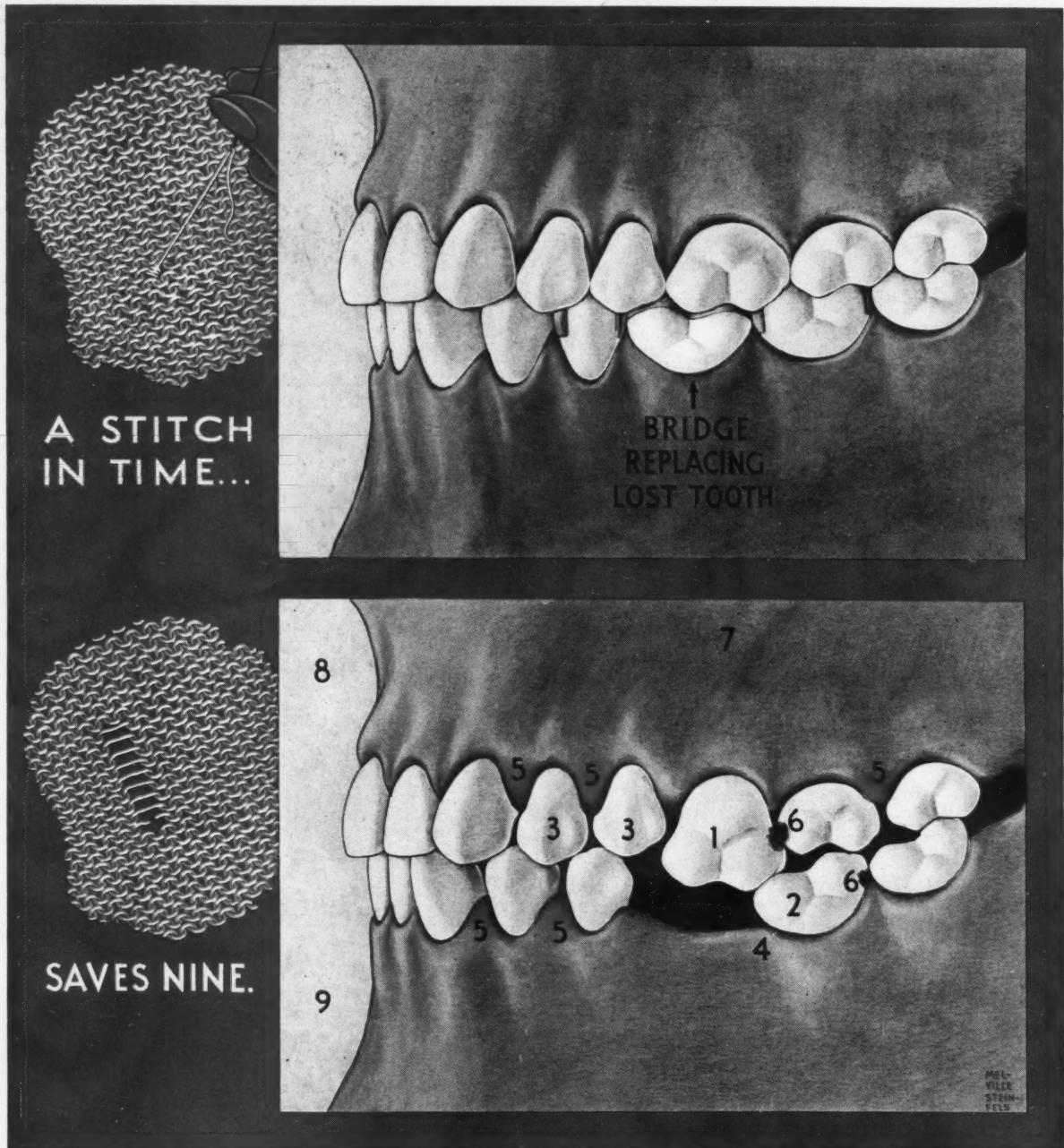
# THE DENTAL DIGEST

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JANUARY, 1939

## VISUAL EDUCATION IN DENTISTRY\*



- 1: ELONGATION  
of upper molar.
- 2: TIPPING  
of lower molar.
- 3: DRIFT  
of upper bicuspids.
- 4: DESTRUCTION  
of bone at site of tipped tooth.
- 5: INFECTION  
of gums at site of open contacts.

- 6: DECAY  
between teeth.
- 7: CHANGES  
in bone at end of elongated tooth.
- 8: DIFFICULTY  
in speech.
- 9: LOSS  
of contour of face by collapse of cheek.

\* This is the first chart in the fourth series of charts intended for the use of the dentist in explaining important dental conditions to his patients. The first three series have been published in bound form under the title, VISUAL EDUCATION IN DENTISTRY. See pages 44-45 for special announcement.

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## About Our CONTRIBUTORS

WALDO BECKLEY, D.D.S. (Baylor University, College of Dentistry, 1926) makes his first contribution to this magazine with an article on surgical extractions for the general practitioner whose needs Doctor Beckley understands because he is himself a general practitioner.

SAMUEL GLENN MAJOR, B.S., D.D.S. (University of Pittsburgh, 1923 and 1921; M.D. (Harvard University, 1927); A.M., M.Sc. in Experimental Surgery; Ph.D. in Surgery (University of Minnesota, 1929, 1933; 1934) received the 1937 award from the American College of Surgeons for his contributions to surgery. Doctor Major is a general surgeon. He has twenty-six titles on his list of professional publications. THE DENTAL DIGEST is proud that three of them appeared in this magazine: CONTRAINDICATIONS FOR NITROUS OXIDE-OXYGEN ANESTHESIA in October, 1932; REMOVAL OF BROKEN NEEDLES, December, 1934; and the article in the present issue for which Doctor Major drew his own illustrations. INFECTIONS OF DENTAL ORIGIN IN THE SOFT TISSUES OF THE HEAD AND NECK is considered of such value and importance to the profession that the DIGEST policy to use only short articles was overruled this month to make way for an exceptional presentation of deserving length.

JOHN GUILFORD SHARP, D.D.S. (Vanderbilt University, 1916; pre-dental, University of Tennessee; postgraduate courses, Bellevue Hospital, New York, in ceramics and economics), has been a frequent contributor to the dental literature, but his practical article on a baked joint detached porcelain crown technique this month marks his first appearance in our pages. Doctor Sharp is a general practitioner with a particular interest in porcelain and root canal therapy.

LEONARD S. FLETCHER, D.D.S. (University of Pittsburgh, 1924) has been publishing with us since August, 1933, when he wrote an article on IMMEDIATE DENTURES. Since then there have appeared CAST IMPRESSION TRAYS, August, 1936, and INDIVIDUAL METAL TRAYS, November, 1937. Doctor Fletcher now offers his technique for FULL DENTURE CONSTRUCTION.

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# Oral Surgery for the General Practitioner

WALDO BECKLEY, D.D.S., *Borger, Texas*

MANY OPERATIVE DIFFICULTIES and postoperative complications can be largely prevented by careful operative procedure. Surgical extractions under aseptic conditions and the division before removal of impacted teeth have reduced effectively the number of swollen faces, after pain, dry sockets, bone infections, spicules, exposed sinuses, and roots pushed into sinuses.

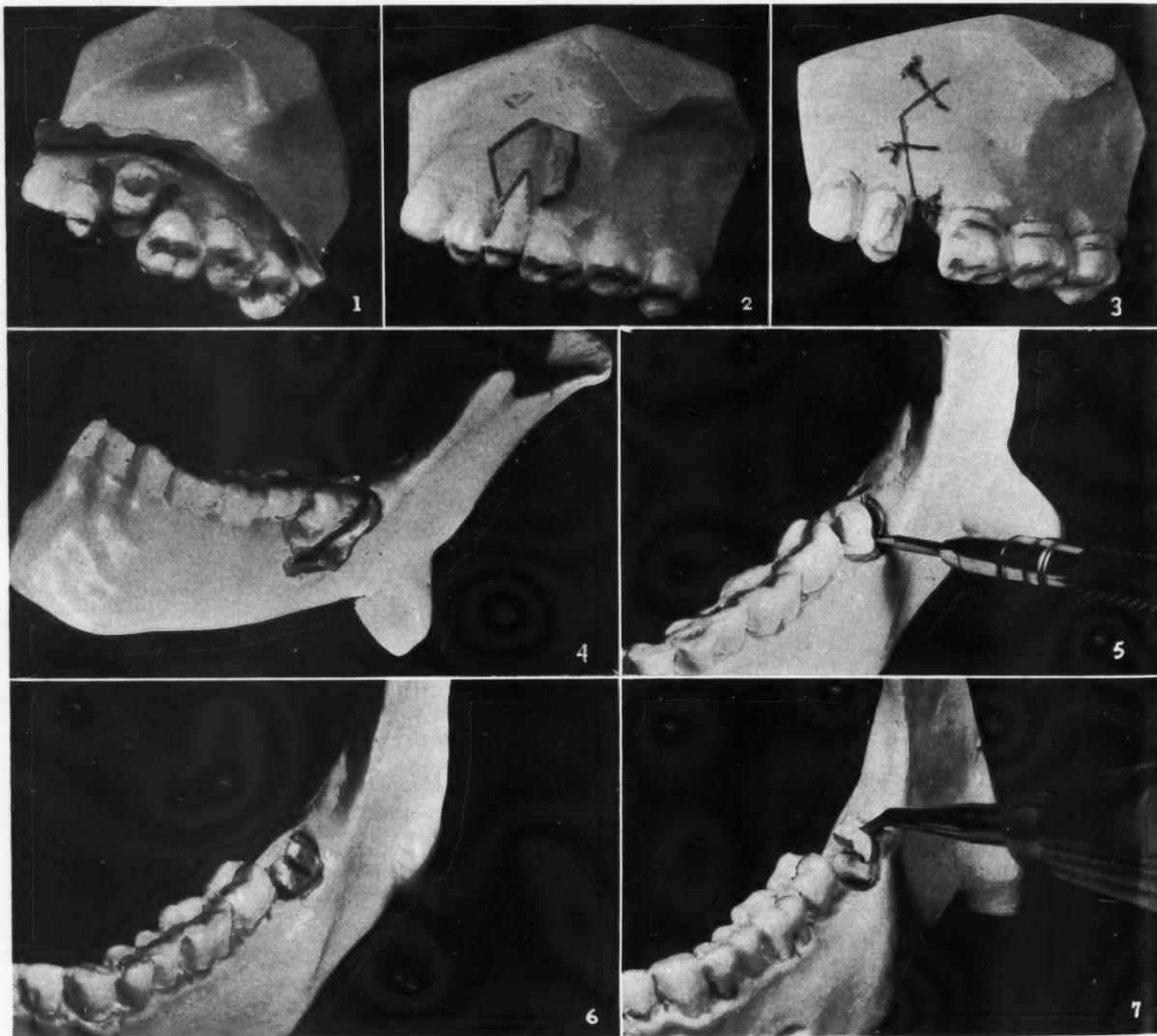
## Surgery and X-Ray Room

An operating room designed for surgery and roentgenography facilitates procedures. The surgery room is built around the chair. Everything should be easily removable up to or away from the chair, as desired. Cuspidor, engine, and bracket table are mounted on extension arms connected to the wall so that they may either remain against the wall or be

pulled out to the chair as needed. A surgical table, mounted on large rubber coasters moves back of the chair easily. During an operation the assistant should be as free on her side of the chair as the operator is on his.

## Value of an Assistant

The dental assistant can make it possible for two brains to think, four





8



9



10

Fig. 1—An attempted bicuspid extraction. Tissue retracted merely to expose fracture of buccal plate. Decay of exposed root surface is certain. Surgical extraction will make this tooth removal simple. The molar and first bicuspid will remain unharmed.

Fig. 2—Mucoperiosteal flap retracted. With mallet and chisel the bone covering root of tooth is removed, in V-shape. Notice again bone foundation for suturing flap. Tooth will be extracted with forceps; little force is used.

Fig. 3—Suture with horse hair. Usually two sutures are needed to secure flap.

hands to work, and four eyes to see. Let her study the literature; teach her good surgery. "Dental Oral Surgery" by Wilton W. Cogswell has been found particularly helpful. The assistant can be trained to do all types of operations with the operator whose words to the patient, whose nod of the head, or movement of the hand or instrument are sufficient cues for assisting efficiently. A well trained assistant means a great deal to a dentist in building a practice.

#### Use of Suction

The use of suction instead of sponges in many cases means the difference between success and failure. Sponges merely tend to pump the infection, already present, down into the sockets. The suction tip works to take away infection and keep the vision clear. After a multiple extraction has been made and the process smoothed, the operator can remove

all small spicules of bone, then suture without fear of a reaction. The suction machine and bottles are kept in a sound-proof cabinet, built into the surgical table.

#### Roentgenographic Examination

Roentgenograms ought to be taken before all extractions. Irregularities, hypercementosed roots, cysts, or osteomyelitis cannot otherwise be determined. In order to plan the easiest approach to the removal of an impacted tooth, several roentgenograms should be taken. The curvature of the roots, and the relation of the impaction to other teeth and surrounding tissues point to the manner of tooth division. In the mandible, it is always well to study carefully the relation of the tooth to the mandibular canal. The operative procedure should be planned so as not to traumatize the nerve and cause postoperative an-

esthesia. In the maxilla, the relation of the maxillary sinus to the tooth to be extracted or the area to be operated on should be studied. Unless a preoperative infection has made an entrance into the sinus, the responsibility of any opening rests on the dentist.

#### Surgical Extraction

Surgical extraction means operating in such a manner as to extract the tooth with the least amount of trauma, while at the same time observing the rules to prevent a dry socket:

1. An incision is made and the mucoperiosteum is retracted.
2. Sufficient bone covering the roots of the tooth is removed to make the extraction without undue force; or, for the removal of an impaction, the tooth is divided to maintain continuity of surrounding bone and tissues.
3. All possible infection, especially

the infected membrane around an impacted tooth, is removed.

4. With suction, all loose bone particles are cleaned away; then the edges of tissues are freshened and sutured.

#### Tooth Division

The foundation rule of tooth division can be told quickly. The many ramifications of its application to each tooth cannot be learned without careful study of many roentgenograms and hours of experience at the chair. The rule: Make the cut with a number 703 bur, deep into the tooth, well beyond the nerve canal, in exactly the direction the tooth is to be split. Then split with flat elevator.

A superficial cut will cause the breaking off of small pieces. The operator need not be impatient even if he fails to divide the tooth classically; he should continue to cut with the bur and split the tooth. As the operator progresses in the use of tooth division, the use of the mallet and sharp chisel will simplify many operations.

#### Surgical Extraction of Second Maxillary Bicuspid

The surgical extraction of a second maxillary bicuspid, for example, can be done more quickly than it takes to tell about it. The patient has a high narrow ridge, a thin buccal plate with either a thin crest at the gingival portion or a thickening in that region. Removal is usually necessary because of an infected pulp canal or bone destruction at the apex. Roentgenographic study for the shape of the root, size of the abscess, and proximity to the maxillary sinus is imperative. The patient should be forewarned of the possibility of difficulties in that area.

The assistant has sterilized all necessary instruments and placed them on a tray, which is on the surgical

table behind the chair. The suction machine has been started, the head light adjusted to the operator's head. The wall bracket is covered with a sterile towel, the cuspidor is back against the wall to allow the assistant convenient room. The patient is seated and topical anesthesia is applied to alleviate the sting of the needle.

1. Infiltration anesthesia is used, and the incision made. This incision is so placed that when the flap is retracted, there will be, first, a clear operating field; second, sufficient bone exposed so that when the necessary amount of alveolar process is removed, plenty of bone remains to act as a foundation against which to suture the flap. This bone prevents collapse of the flap and preserves the continuity of the bone.

2. With a mallet and sharp chisel the process over the root is removed in a V-shape (Fig. 2). Suction keeps the field clear of blood; also each bone shaving is removed from the mouth as each cut is made with the chisel.

Should the roentgenogram show apical abscess, the amount of process removed is extended to include the infected area. This secures clear vision, making possible the thorough removal of all infected material.

3. Forceps are used to extract the tooth.

4. Curet all infected material.

5. With bone file or chisel the margins of bone are rounded.

6. With a small curet, examine the area and remove every piece of loose bone.

7. Flood the area with 7 per cent mercurochrome.

8. Suture with horse hair (Fig. 3).

9. Cold compresses are to be kept over the area most of the day, with rest periods to relieve the monotony.

10. The patient is instructed to return at regular intervals for observation.

#### Horizontal Mandibular Impacted Third Molar

Figs. 4 through 10 illustrate the removal of one type of horizontal impaction in the mandible. The impacted tooth is just as easy to cut with the bur as any other tooth in the mouth. Dentists may use a drill if they lack the nerve to split a tooth with the sharp chisel and mallet. For some patients, it is more desirable to divide the tooth with a drill.

A horizontal lower impaction may be removed by tooth division. It does not matter how many divisions are made. Pain and swelling result when force is used, because trauma to surrounding bone and tissues is caused.

Roentgenograms taken at proper angles determine the position of the tooth, length and shape of the roots, and the relation of roots to the mandibular canal. Talk candidly to the patient. Explain what you are going to do and why. Instruct the patient to take a pentobarbital sodium capsule thirty minutes before the appointment.

Before the patient arrives, all instruments are selected and sterilized. The handpiece is sterilized, then wrapped in sterilized gauze. The dental motor is pulled out to the chair. Four 703 burs, four 702 burs, four spear point number 14 Callahan burs are sterilized in cold solution. These are then placed on a sterile towel covering the bracket table. Otherwise the same preparations are used for the regular surgical extraction.

The operative procedure is illustrated in Figs. 4 through 10.

Postoperative care must be carried through to insure the successful consummation of operative efforts. Irrigate each day with mild antiseptic solution. Every two or three days, flood the area with 7 per cent mercurochrome. As a rule, remove sutures on the third day.

*Crusoe Building.*

# Infection of Dental Origin in Soft Tissues of the Head and Neck\*

GLENN MAJOR, D.D.S., M.D., Ph.D., Pittsburgh

DENTAL SEPSIS is a common source of facial and cervical cellulitis, septic adenitis of the cervical glands, venous thrombosis, and other forms of infection of the adjacent soft tissues. Although the present article is not primarily concerned with osteomyelitis, soft tissue involvement is usually associated with this process. It is true that many infections of dental origin are self-limited, and many clear up spontaneously by resolution or by spontaneous evacuation of the purulent material. It is equally true, however, that some disorders of this type run a fulminating course, and a few terminate fatally. Frequently the latter group is treated expectantly even in the presence of the fatal signs.

## Evidence of General Resistance of Patient

To cope intelligently with soft tissue infections of the face and neck, one must be thoroughly familiar with the clinical problem as well as with the detailed anatomy of the parts involved. The clinician must evaluate all the available data as to the probable nature of the infection, its severity, and the general and local resistance on the part of the patient. Obviously, a rapidly spreading infection is more of a menace than one that extends slowly over the course of several days. Marked elevation of temperature and a rapid pulse are often grave prognostic signs. The general appearance of the patient is important. Extreme prostration, even in the presence of a slight elevation of temperature is usually serious. The history of chills is often indicative of venous thrombosis or septicemia, or both. One must differentiate between chilly sensations and true rigor. Leukocyte counts should be done in all such cases. Paradoxically, a normal or subnormal white cell count, and a normal

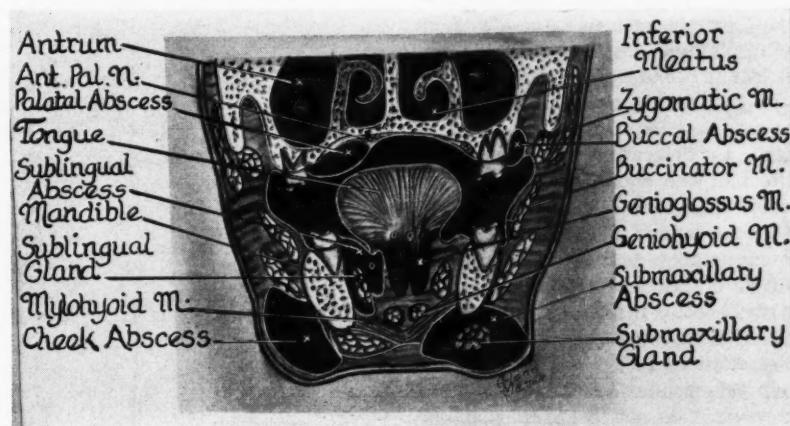


Fig. 1—Infection of dental origin in various anatomic parts.

or subnormal temperature are poor prognostic signs in these cases. The association of an agranulocytosis (diminution of neutrophils of the blood) and cervical or facial cellulitis is usually dangerous; it means

that a great deal of the body defense has been lost.

## Bacteriology of Infection

The causative organism is a determining factor in the ultimate out-

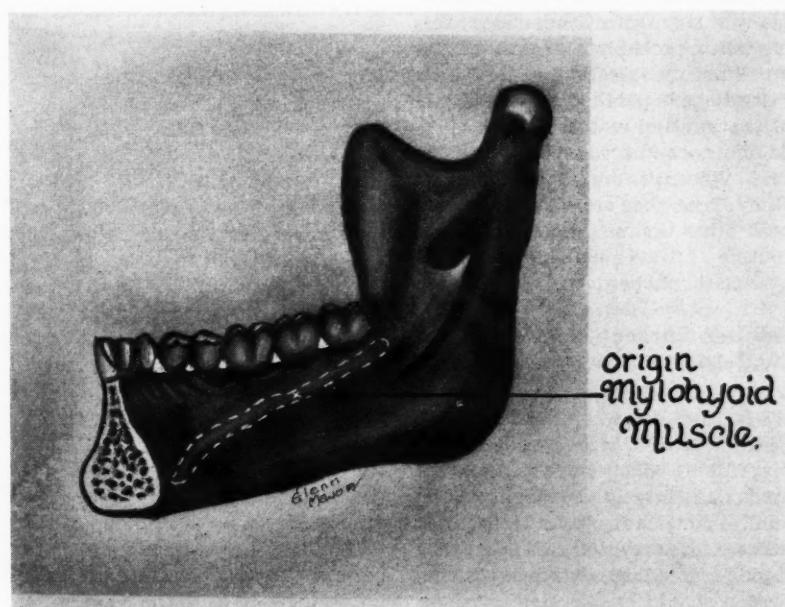


Fig. 2—Attachment of mylohyoid muscle to inner aspect of body of mandible.

\*From the Western Pennsylvania Hospital, Pittsburgh.

come of the process. Cultures and smears should be taken routinely in all soft tissue infections. Staphylococcal lesions of the soft tissues about the face and neck tend to localize more readily than those caused by the streptococcus. Since the advent of chemotherapy in the treatment of streptococcal infections, such bacterial studies are increasingly important. In the latter case the patient should receive large doses of sulfanilamide. In our clinic we restrict the use of this drug to hospitalized patients, so that frequent blood counts may be done (every second day) to determine the depressing effect of the agent on the red and white corpuscles.

Sulfanilamide has been, and still is, much abused. It is not a panacea but is of distinctive value in many streptococcal infections. Sulfanilamide should always be employed with discretion and under close observation. When sulfanilamide is indicated, however, I do not feel that it should be used sparingly, but should be prescribed in doses that will maintain the serum content of the drug at therapeutic levels. Recently we have been planting anaerobic cultures in such infections and have found in many cases that an anaerobic streptococcus was present. In these, also, sulfanilamide has often been a valuable aid. It is probable that the foul odor of many of these infections is due to this organism, probably with a concomitant Vincent's infection.

It will be noted that routine smears of the infected material are studied. In the neck and face we frequently find Vincent's organisms by such study. True, they are often associated with other organisms. In such cases routine intravenous injections of arsenic should be given.

#### When Surgery Should Be Advised

Given a patient with cellulitis of the face or neck, when should surgery be advocated? There is no hard and fast rule by which a decision may be made. It is largely dependent on the clinical judgment of the surgeon. In general, it may be said that the rapidly-spreading fulminating infection should be operated on as an emergency. More conservative treat-

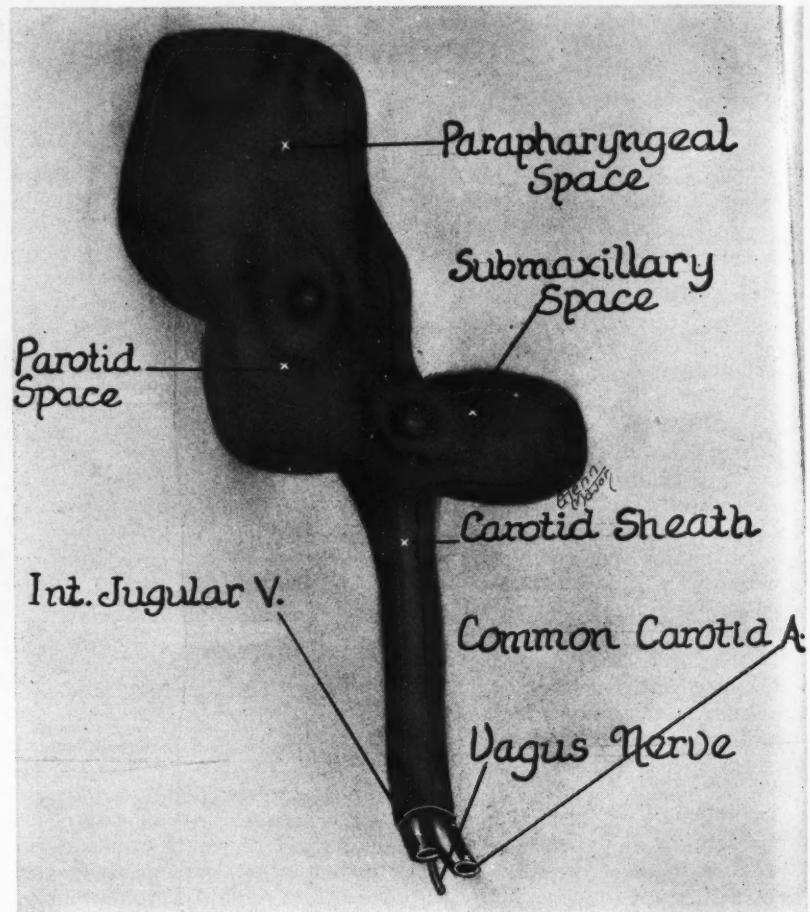


Fig. 3—Schematic representation of parapharyngeal, submaxillary, parotid, and carotid fascial spaces, showing resemblance to three-leaf clover.

ment may be followed when the infection is not progressing several days after the onset and the patient is reacting well. The location of the infection is also important. Infections about the upper lip and about the nose should be treated expectantly, whereas those of the parapharyngeal space and carotid sheath should be operated on immediately.

Should heat or cold be used in the expectant treatment of the case in which surgery is delayed? This question has created more discussion than it justly deserves. The "colds" feel that the "hots" are virtually signing the death certificate of the patient, and vice versa. Often the patient is the best judge as to which agent is the more comfortable, and perhaps this is a fair criterion as to the choice of an agent. Probably the advantages and

the disadvantages of both heat and cold have been vastly overestimated. In the deep-seated fascial infections of the neck, it is a little difficult to visualize how much good, or harm, either agent can do in an infection that is located an inch and a half from the skin surface, as in a parapharyngeal inflammatory process.

#### General Therapeutic Measures

1. In the more severe infections general supportive measures are of value, including the adequate administration of fluids and an adequate caloric intake.
2. Swallowing is often a problem, and it is occasionally necessary to insert a stomach tube through the nose for feeding purposes.
3. In dyspneic cases tracheotomy is occasionally a life-saving procedure.



Fig. 4—Sublingual space and its communication with submaxillary space about posterior free edge of mylohyoid muscle.

4. In our clinic we resort to small repeated transfusions of whole blood, using from 150 cc. to 250 cc. every second or third day.

5. In cases in which the Vincent organisms are recovered from the exudate, small doses (0.2 Gm.) of neo-arsphenamine are given every second or third day. We rarely resort to non-specific protein therapy.

6. Roentgen irradiation is employed in many of the low-grade, subacute cases, but we do not employ it in the deep-seated, fulminating, rapidly-spreading processes.

#### General Routes of Dissemination of Infection

Infection of dental origin is disseminated along certain definite pathways. Many of these processes extend through the cortical bone, reach the subperiosteal area, and localize, or extend for considerable distances beneath the periosteum before localizing. In general, however, extension along muscle planes and along the cervical fasciae is the most common method for spread of these infections.

Another manner of transportation

is by the venous route. The infection may thus be spread to remote parts of the body by a generalized bacterial invasion of the blood stream. Often the wall of a vein is involved at the site of infection and an infected thrombus is formed, which may either serve as a focus from which organisms are disseminated to other parts of the body, or the thrombus may progress in a retrograde manner and reach the larger venous radicles. Thus, the cavernous sinus or the internal jugular vein may be involved.

Still another method of spread of the infection is by way of the lymphatics.

#### Localized Subperiosteal Infections

The most simple of the soft tissue infections about the mouth of dental origin are those localized infections (abscesses) which are located beneath the periosteum, or are extra-periosteal localizations of pus. The infection extends through the bone to reach the soft tissues and there localizes, either at the point of exit from the bone, or at a short distance, without appreciable involvement of the fascial spaces, veins, or lymph glands. Such infections may occur on the palatal, lingual, labial, or buccal aspects of the jaws (Fig. 1). These infections may extend laterally and present in the cheek. There are no associated signs and symptoms except those of localized pain, tenderness, and general sepsis. The treatment is simple incision and drainage, either inside the mouth or extra-orally, depending on the location of the abscess.

#### Frequency of Infection Arising from Lower Molars

It has been said that infections in and about the upper lip lie in the "danger zone of the face." It might as aptly be said that infections about the lower molars, and particularly the lower third, occur in the "danger zone of the neck." In my experience the infections about the lower molars initiate as many, if not more, grave infections than infections of all other teeth. Obviously the reasons for this observation must be explainable on either mechanical or anatomic grounds, inasmuch as the general



Fig. 5—Submaxillary space; lower part of parotid space; submaxillary and parotid fasciae; and relation with contents of carotid sheath.

resistance of the patient and the bacterial flora are the same in lower molar as in other dental infections. Gravity drainage from the maxillary teeth and their sockets mitigates against infection in the upper jaw. Unfortunately drainage from the lower sockets is poor. This fact, however, does not explain the frequency with which the lower molars are foci of cervical infections, in contrast to the other lower teeth.

#### Importance of Mylohyoid Muscle

One factor considered important in the explanation of these infections is the line of origin of the mylohyoid muscle from the mandible (Fig. 2). It will be observed that the line of attachment is not parallel with the alveolar process, but that there is a distinct and appreciable elevation of the line of origin, proceeding posteriorly. This is of major importance in that in the anterior portion of the mandible, infections penetrating through the lingual plate tend to extend above the attachment of this muscle, and may become submucous above the submaxillary space, and often above the sublingual space, thus avoiding the important fascial spaces of the neck. In the more posterior infections, however, and in the case of the molars in particular, such infections extend directly into the submaxillary spaces, and occasionally into the sublingual spaces.

#### Importance of Fascial Spaces of Neck

In order to understand the fascial dissemination of infections of the neck, one must understand the anatomy of this region. Only the more important points will be stressed here. From the standpoint of dental infections, five fascial spaces are of paramount importance. These may be roughly visualized as one space occupying the floor of the mouth; three, the upper part of the neck; and one extending throughout the length of the neck into the superior mediastinum (the space between the lungs in the upper part of the thorax). Exclusive of the space in the floor of the mouth, the sublingual, the spaces have been compared with a three-leaf clover having a long stem, each

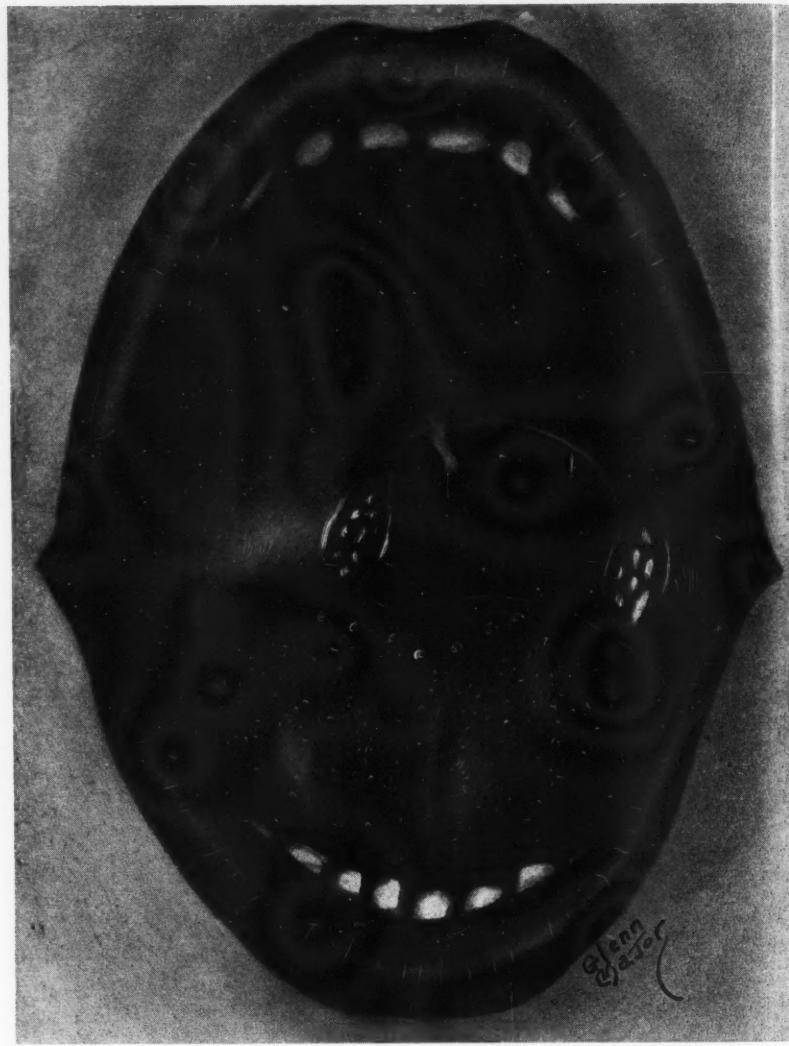


Fig. 6—Appearance of throat in parapharyngeal space infection. Tonsil and tonsil bed of affected side are deviated toward midline, and uvula is displaced toward unaffected side.

of the upper three spaces in the neck being represented as a leaf, and the fourth fascial compartment extending downward from the others as the stem (Fig. 3). The spaces corresponding to the leaves of the clover are the parapharyngeal, submaxillary, and parotid spaces. The stalk of the clover is represented by the carotid sheath. These will be briefly described.

**Sublingual Space**—This compartment is slightly less important than the other spaces. It lies directly beneath the mucous membrane of the floor of the mouth, above the level of the mylohyoid muscle. Through it pass the submaxillary duct, the lingual and hypoglossal nerves, the lin-

gual artery, and lingual veins. Infections of this space would be superficial and more or less self-contained were it not for the anatomic fact that this compartment communicates freely with the one directly below and behind it, the submaxillary space, around the free posterior border of the mylohyoid muscle (Fig. 4). As a matter of fact, the submaxillary gland, which is a component of the submaxillary space, sends a prolongation upward and forward around the posterior free edge of this muscle, so that the two salivary glands are almost in contact. Furthermore, the submaxillary duct, a component of the sublingual space, is in direct con-

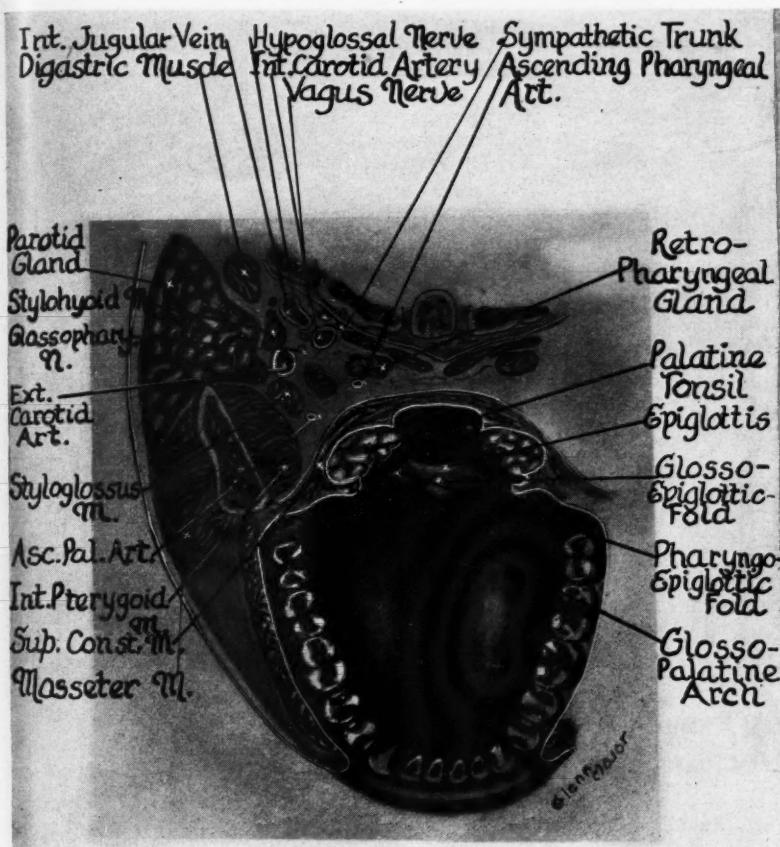


Fig. 7—Horizontal view through parapharyngeal space showing anatomic relationships.

tinuity with the submaxillary gland. Occasionally, however, infections do remain localized in the sublingual space (Fig. 1).

The symptoms of uncomplicated infection of this region are (1) elevation of the tongue on the affected side with localized pain and tenderness; (2) pain on swallowing owing to involvement of the mylohyoid muscle, and (3) general signs and symptoms of sepsis. There is little or no external swelling.

In the treatment of the uncomplicated case, cure can usually be effected by intra-oral incision and drainage. In making this incision one should remember that in the posterior part of this space the lingual nerve is in close relationship with the mandible and should be avoided by a medially placed incision, parallel to the direction of the nerve. In the anterior confines of the space, on the other hand, the incision should be placed in proximity to the

mandible, because as the lingual nerve progresses anteriorly, it comes to lie in a more medial position. In our clinic we employ iodoform gauze for intra-oral drainage, and this is usually done under pentothal sodium anesthesia; whereas for extra-oral incisions, we use small rubber drains (penrose type), and generally employ nitrous oxide-oxygen anesthesia.

*Submaxillary Space Infections*—This space is represented by the most anterior leaf of the clover (Fig. 3). It is formed by the division of the superficial cervical fascia to enclose the submaxillary salivary gland, the inner leaf of the fascia being attached to the mylohyoid line and the outer leaf of the fascia to the inferior margin of the mandible (Fig. 5). It will be noted in this drawing that the fascia is penetrated below and posteriorly by the external maxillary artery and anterior facial vein. The points of entrance and exit of these vessels are of importance in the dissemination

of pus from this area. The submaxillary fascia is thin and infection frequently extends from here to the parotid and to the parapharyngeal spaces, as well as to the carotid sheath.

The signs and symptoms of submaxillary space infection include (1) external swelling; (2) pain and tenderness over the area; (3) pain on swallowing; (4) little or no trismus, and in cases not complicated by concomitant infection of the sublingual space, (5) there is little elevation of the tongue and floor of the mouth. The uncomplicated type is the one commonly seen. Treatment includes external incision in the submaxillary triangle, avoiding the lower branch of the facial nerve (Fig. 11).

*Parotid Space Infections*—The parotid space is represented by the posterolateral leaf of the clover (Fig. 3). It also is formed by division of the superficial fascia into two layers, to enclose the parotid gland. The inner leaf of the fascia is deficient above, so that here the parotid space is in direct communication with the parapharyngeal compartment—a fact of clinical importance. A special thickening of the inner leaf of parotid fascia forms the stylomandibular ligament, separating the anteromedial aspect of the parotid from the submaxillary gland. The parotid space contains the parotid gland, the posterior facial vein, and the facial nerve. In operations in this area, particular attention is given to the facial nerve because injury to this structure results in paralysis of the face.

The signs and symptoms of parotid space infection are often modified by an associated involvement of one or more of the other fascial spaces. Inasmuch as this compartment is in such close relationship with the submaxillary and with the parapharyngeal spaces, coexisting infection of one or both of these spaces is often present. It is indeed rare that the parotid space is independently involved in dental infections. In septic parotitis, however, this is often the case. The patient complains of severe pain over the parotid region; pain is accentuated by ingestion of food; mastication is difficult; there is usually some trismus, and pain is re-

ferred to the region of the ear and up over the temporal area. Usually the saliva from the affected parotid is clear, unlike that seen in septic parotitis, and this is an aid in differentiation between the two conditions. The treatment consists in incision and drainage of the affected area, care being exercised to avoid injury of the facial nerve.

**Parapharyngeal Space Infections—** This space is represented by the posteromedial leaf of the clover (Fig. 3), and is more important than any of the preceding with regard to dental infections. The space (also known as the pharyngomaxillary or mandibulopharyngeal) is closely associated with the carotid sheath below and with the base of the skull above; it is more of a potential than an actual space, and may be roughly considered as that region between the lateral aspect of the throat with its superior constrictor muscle as the inner boundary; the internal pterygoid muscle below and the parotid gland above as the lateral boundary; whereas the posterior boundary is formed by the prevertebral muscles and fasciae. The space is cone-shaped, with the base above being attached to the skull and with the apex below merging with the carotid sheath. The space is divided into unequal parts by the styloid process and the structures arising from it—styloglossus muscle, stylohyoid muscle, stylopharyngeus muscle, and the stylomandibular ligament (Fig. 8). The space also contains the great vessels and nerves of the neck (Fig. 7). Above and laterally, as already noted, the space is in direct communication with the parotid compartment.

It will be readily understood why infections in this space are prone to be quickly disseminated. Infection may be carried upward through the various foramina at the base of the skull and eventuate in intracranial infection (brain abscess, meningitis, or sinus thrombosis), usually through the medium of vascular channels. Frequently, however, the infection travels down to the apex of the cone and into the carotid sheath. Rarely the base of the skull becomes the seat of an osteomyelitic process. On many occasions, however, we have been impressed with the upward spread of



Fig. 8—Parapharyngeal space as seen from behind. Internal pterygoid muscle and parotid are lateral; constrictor muscle is medial; structures arising from styloid process are seen between.

these infections at a more superficial level, diffusing upward along the course of the temporal fascia. We have seen one case in which the process thus reached the temporal area, the skull in the lower part of the coronal fissure became infected, sequestrum formation ensued, and after several months the patient recovered. In many other cases we have seen the cellular tissues of the orbit of one or both sides involved by a similar upward migration of the infection. In one of our most interesting cases the primary infection was in the parapharyngeal space (following a lower molar extraction). The infection spread upward over the temporal area, both orbits became involved, so

that virtually the entire eye was outside each orbit. The patient finally recovered, after rather extensive surgery.

The symptoms and signs of parapharyngeal space infection are characteristic. The history usually reveals either the extraction of a lower molar, or an infected molar still in place. The one outstanding finding in our series has been the inability of the patient to open the mouth. The trismus may be absolute or slight opening of the mouth may be possible. Often this condition is so advanced that the tonsillar areas cannot be visualized. Because of this lack of visualization the cases are too often treated conservatively. Under

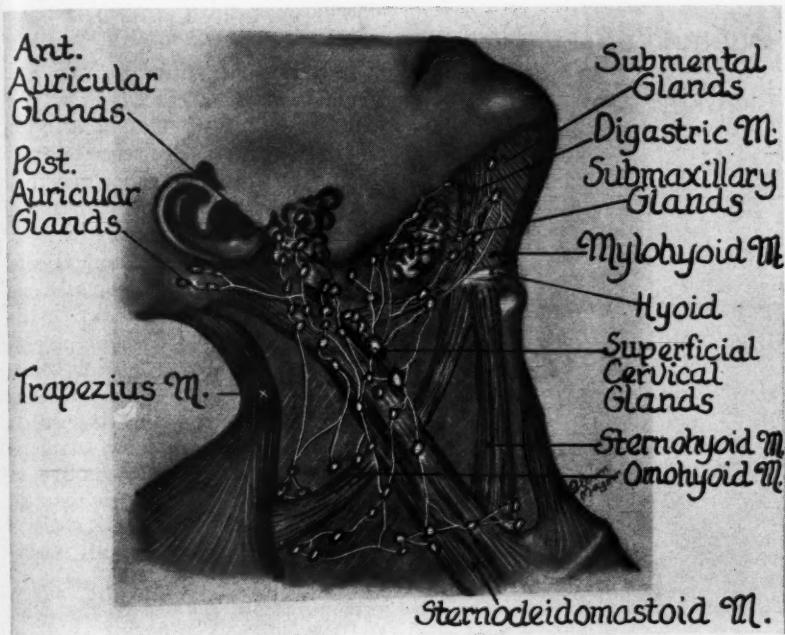


Fig. 9—Superficial cervical lymph glands.

these conditions the patient should be given a general anesthetic and the mouth forcibly opened for inspection of the involved areas. On examination the tonsillar pillars and tonsil of the affected side are displaced toward the median line, and the edematous uvula is deviated toward the un-

affected side of the throat (Fig. 6). The patient complains of severe pain in the tonsillar area, swallowing is extremely painful and sometimes almost impossible. Referred pain to the ear is a common complaint. Associated with this are the general signs and symptoms of sepsis, as discussed.

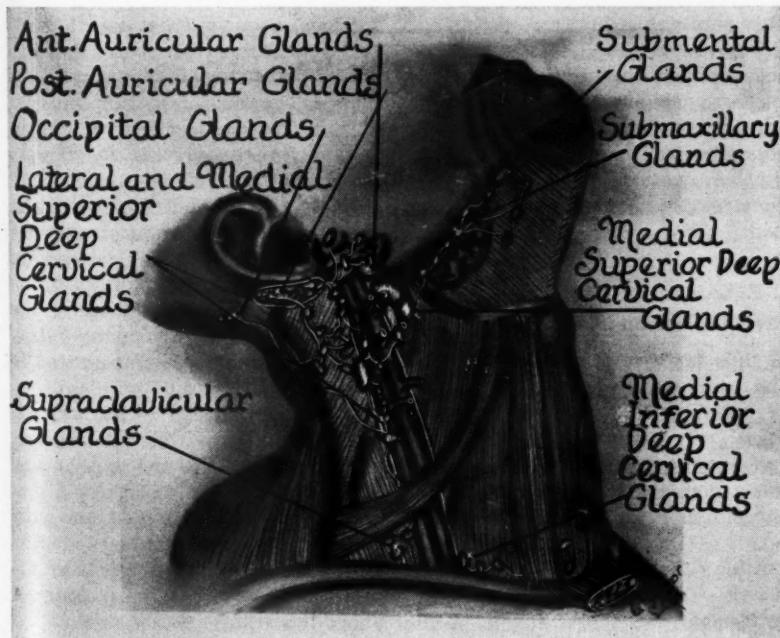


Fig. 10—Distribution of deep cervical lymph glands along carotid sheath.

This condition is to be differentiated from peritonsillar abscess (quinsy) since the location of the infection and the treatment are radically different. In peritonsillar abscess the patient is usually able to open the mouth. The displacement of the tonsillar area is common to the two conditions, but in parapharyngeal space infections a normal appearing tonsil is carried medially, whereas in peritonsillar abscess the tonsil is markedly congested and inflamed and is obviously the primary seat of the infection.

In the treatment of parapharyngeal space infections, it should be understood that the inflammatory process is deep-seated and there is little or no anatomic barrier to its spread down the carotid sheath into the mediastinum; hence, early surgical intervention is imperative in the majority of cases. True, some of these will resolve spontaneously, but it is difficult to evaluate the potentialities in this direction of a given infection involving this area. The incision is extra-oral and not intra-oral, and is made parallel with the inferior margin of the mandible and at a little distance below it so as to avoid the lower branch of the facial nerve. It is placed above the posterior belly of the digastric muscle and anterior to the upper part of the sternomastoid muscle (Fig. 11). It should be adequate to admit the tip of the finger, although we generally prefer instrumental to digital exploration of the area. After the skin incision has been made the dissection is finally completed by similar instrumentation with a long curved hemostat. Rubber drains are introduced into the depth of the space and the wound is left unsutured. It is surprising that we have never encountered bleeding of any consequence by this procedure. The tissues are edematous, and this method of dissection is thus facilitated.

*Carotid Sheath Infections*—In our clinic we feel that infections involving the carotid sheath are real surgical emergencies and should be treated as such. The carotid sheath is that mass of fascial condensation which surrounds the internal jugular vein, the vagus nerve, and the com-

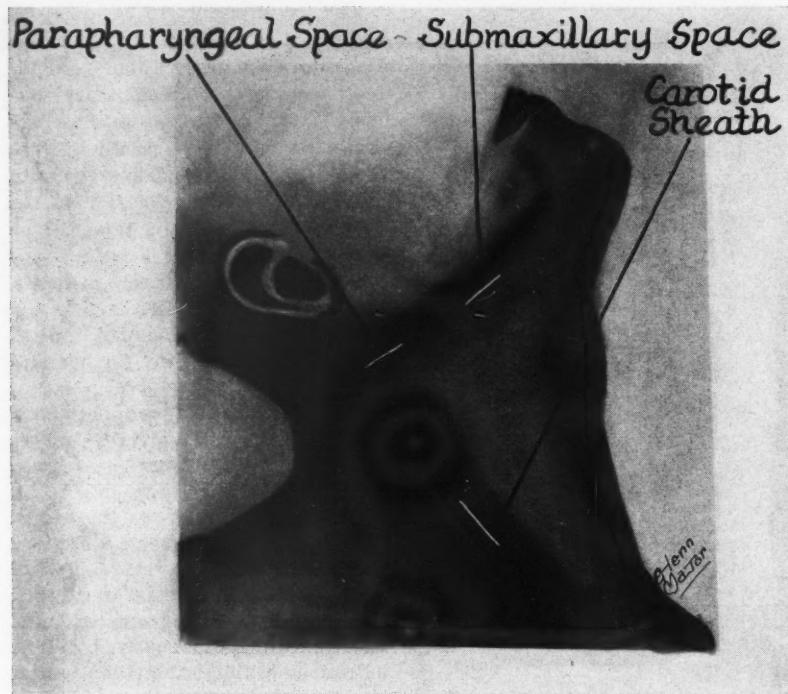


Fig. 11—Line of incision for drainage of infection in various fascial spaces.

mon and internal carotid arteries, and may be thought of as a sort of "core of the neck." Mosher has aptly termed it the "Lincoln Highway of the neck." It is the highway that pus pursues, and is the highway that the surgeon must pursue in the pursuit of pus. The diagnosis of carotid sheath infections is often difficult and often impossible without exploration, unless there is thrombosis of the internal jugular vein, in which case the patient usually experiences chills, septic temperature, and pain localized to this area. Sometimes induration can be felt along the course of the involved vessel. Obviously, in such cases the carotid sheath must be opened immediately, the vein palpated, and if it is indurated it should be ligated at a point below the lower limit of involvement. We feel, however, that in every rapidly spreading, fulminating infection of the upper neck the carotid sheath should be explored through a small incision along the anterior aspect of the lower part of the sternomastoid muscle, usually above the posterior belly of the omohyoid muscle (Fig. 11). In such cases it is our custom to explore the sheath,

and if the jugular vein is thrombosed, it is ligated. If not, we pack the sheath with iodoform gauze, thereby walling off this area before the infection has had the opportunity to pass this point, thus limiting its further downward descent. Our experience has justified this procedure. In the more slowly progressing, low grade infections of the upper neck, however, this procedure is not warranted. One must evaluate the case and employ considerable clinical judgment in so doing.

#### Extension of Infection along Venous Channels

Thus far we have only considered the dissemination of infection by way of the muscle and fascial planes. Many other mechanisms may be brought into play. The veins of the affected area may be involved and the thrombosis extend upward or downward, as the case may be, thereby reaching larger radicles. Septicemia is often associated with this process. If feasible, such veins should be ligated beyond the limit of the thrombosis.

#### Extension by Lymphatic Routes

Another mechanism for the dissemination of infection is by way of the lymphatics. In Figs. 9 and 10 the superficial and the deep cervical lymphatics are shown. Infection may thus spread directly to the cellular tissues of the neighboring areas by permeation of the walls of the lymph vessels. (The lymphatic system is a closed one as regards the tissue spaces.) Or the infection may set up a septic process in the regional lymph glands which suppurate, and the infection thus reaches the surrounding tissues. It will be noted particularly that the deep cervical lymph glands are in close association with the carotid sheath, and the latter fascial space is occasionally infected by this mechanism.

#### Infections of Superior Mediastinum

Once infection has reached the superior mediastinum the surgical treatment is less satisfactory than when infection is still confined to the neck. These disorders, however, may likewise be approached surgically, with some light degree of success.

#### Upward Spread of Infections

It has already been noted that infections of the parapharyngeal, parotid, and submaxillary spaces may extend upward along muscle and fascial planes. The most important muscles in this respect are the temporal, in which case the process is likely to localize rather superficially along the masseter muscle and along the internal pterygoid. In the latter case the infection reaches the infratemporal fossa and is then in proximity to the various foramina at the base of the skull. It is likely that many intracranial infections are transmitted to the interior of the skull by direct continuity. The majority of intracranial infections of dental origin, however, reach the interior of the skull by way of venous channels. The three intracranial complications that are most common are brain abscess, meningitis, and sinus thrombosis (thrombosis in the large venous channels about the brain). Thrombosis of the cavernous sinus is most frequent. This, as the name implies, is a large

venous pathway lying on each side of the body of the sphenoid bone. The venous canals are separated by numerous endothelial-lined trabeculae, so that on cross section the sinus has a fancied resemblance to cavernous structure. The most frequent manner in which infection reaches this area and initiates the process of cavernous sinus thrombosis is along the anterior facial vein. Because this vein drains the upper lip and external nose, this region of the face has been referred to as its danger zone. The infection from an abscess about an upper anterior tooth may involve a small vein which is a tributary of the anterior facial, an infected thrombus forms and this extends in a retrograde manner into the larger radicles of the vein, and eventually reaches the main trunk of the anterior facial vein. The anterior facial vein is not provided with valves, so that the thrombosis may extend in either direction. It tends to spread upward along the angular vein at the side of the nose, into the ophthalmic veins (both superior and inferior) which lie in the orbit, through the superior sphenoidal fissure, and thus directly into the cavernous sinus.

There are many other routes, however, by which venous infection may reach the cavernous sinus, among which are: (1) from the diploic veins of the skull through anastomosing channels to the cavernous sinus; (2) through a communication between the internal jugular vein and the sinus; (3) from the pterygoid venous plexus to the cavernous sinus through various foramina at the base of the skull, including the emissary vein passing through the foramen ovale; (4) through the emissary vein of the foramen of Veselius, and (5) through the vein which passes in company with the internal carotid artery and enters the interior of the skull through the foramen lacertum. There are also several other less important pathways of communication between the cavernous sinus and extracranial veins. Fig. 12 shows the more important anastomotic channels.

Although we advise routine ligation of the internal jugular vein in thrombosis of that vessel, we do not feel that surgical ligation of the anterior facial or angular veins is a worthwhile procedure, because this involves con-

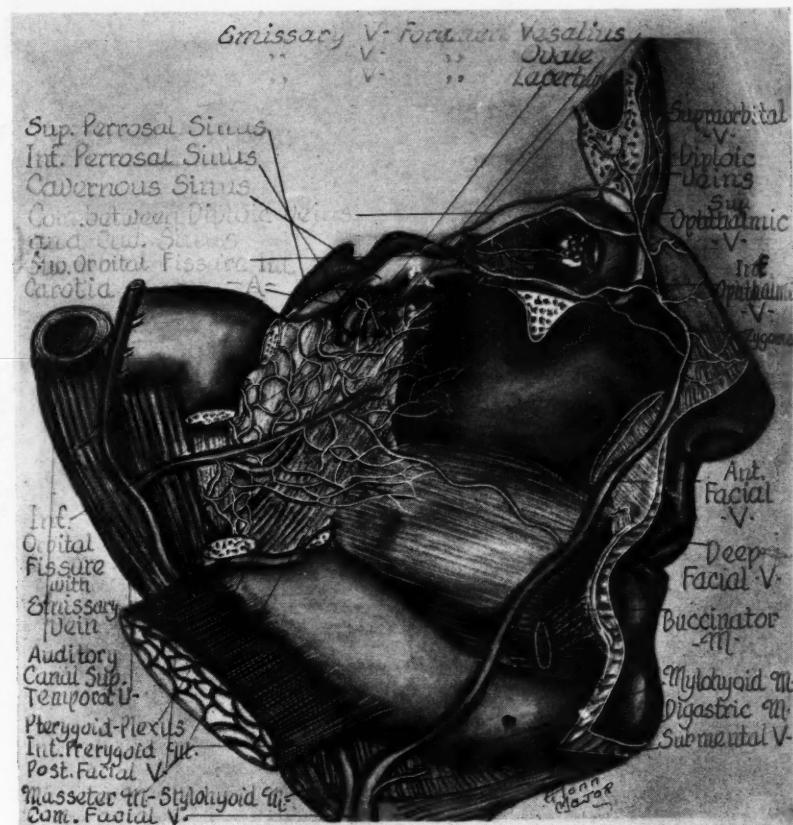


Fig. 12—A few communications of cavernous sinus with veins of face and with those of pterygoid area.

siderable dissection in the so-called "danger zone of the face." Occasionally, however, we have divided the vein high by the use of the electro-surgical knife (high frequency cutting current), carrying the incision deep so as to be certain that the vein has actually been divided. Bleeding is then controlled by gauze packing. In this procedure, it will be evident that no dissection is required.

#### Ludwig's Angina

This paper would not be complete without mentioning the condition so glibly referred to as Ludwig's angina. Two schools exist as to the status of this condition as an entity. One would accept it as a distinct and definite condition, whereas the other would consider it as a form of cellulitis which should not be classed as a clinical entity. I am definitely inclined to the latter view. The term has been used loosely to designate a variety of infections of the neck and floor of the mouth. Infection of any one of

the fascial spaces of the neck already described, or any combination of these, has at one time or another been referred to as Ludwig's angina. In his original description of the condition in 1826, Ludwig did not accurately designate the location of the septic process as related to the various fascial spaces. Indeed, operation was not done in his five cases, because in his day it was not customary to incise and drain phlegmons. He insisted that the condition was an inflammation of the cellular tissues, which began about the submaxillary gland, subsequently involved the neck and the floor of the mouth, and ran a progressive course with death in ten or twelve days, or ended in the gradual recovery of the patient. It is characterized, he said, by an insignificant inflammation of the throat proper, a peculiar woody hardness of the cellular tissues, hard swelling beneath the tongue and inner border of the mandible, well defined outline of this

(Continued on page 21) 17

# The Baked Joint Detached Post Porcelain Crown

J. GUILFORD SHARP, D.D.S., Knoxville, Tennessee

## Problem

THE PROBLEM is to find a substitute for the following appliances: (1) the cast gold joint so frequently used in the application of a stock porcelain tooth, particularly in the anterior teeth; (2) the cast gold stump used in making a porcelain jacket crown for pulpless teeth; and (3) the usual restoration of those anterior teeth broken by accidental trauma far below the gums, particularly in young patients for whom bridgework would be impracticable or for whom space retainers would be disfiguring. A baked joint detached post porcelain crown offers a constructive repair as the solution to this problem.

## Definition

A baked joint detached post porcelain crown is a stock porcelain tube tooth, or detached post crown, which has been fitted or adapted to the prepared tooth root by means of baked porcelain. The baked porcelain becomes a part of the tube tooth or detached post crown.

## Advantages

The technique to be described utilizes baked porcelain to eliminate the objectionable appearance of gold and the additional work involved in the construction of a gold casting. The porcelain, besides being more esthetic than the gold is better tolerated by the soft tissues and an accurate joint is more easily obtained.

I believe this baked joint detached post porcelain crown will serve as well or better than the porcelain jacket and will be less expensive. It can be made quicker than the porcelain jacket and may be stained and contoured; moreover, it may be repeated that the technique eliminates the casting of the gold stump, so that the post porcelain crown can replace the porcelain jacket for the pulpless tooth. This crown can likewise be used as a space retainer, or, in the

partly erupted tooth, it can be made as a half crown at first, being replaced as the tooth erupts and the gums recede.

It is a simple technique—one that saves time for the operator who uses his own porcelain furnace as well as for the dentist who does not possess a porcelain furnace but does have an electric wax eliminator or heat-treating equipment capable of producing about 1700° F. or higher, preferably about 2000° F.

## Indications for Use

The controversy concerning the extraction or retention of pulpless teeth will not be entered into in this article nor will the technique for the treatment or filling of root canals be considered. The concern here is not what should be done with the tooth root but what constructive treatment may be done if the root is present and is not to be extracted. There is a definite need for this procedure for those who are not entirely in favor of extractions of all pulpless teeth.

This crown can be adapted only to pulpless teeth, or teeth in which devitalization is necessary; otherwise a porcelain jacket crown should be used.

The baked joint detached post porcelain crown is more useful in the anterior or single-rooted teeth, although it can, by modification of the post, be used on the multirooted teeth.

The crown is most suited to those upper anterior teeth that have been severely traumatized or where a porcelain crown is desirable for any reason.

## Contra-Indications

The crown being discussed would be contra-indicated on a tooth root that has broken so far below the alveolar margin that it is impossible to take an accurate impression. It would also be contra-indicated where

the root is so weakened that it would likely split if stress were applied. Other conditions which would preclude the use of this crown are: (a) the close bite where the thickness of porcelain would be insufficient for strength; or (b) the extremely concave lingual surface which would present the same difficulty; also, (c) the type of case in which the post cannot be sufficiently centered in the crown; (d) the type in which the weakness of the root would require banding or modified banding, although a depressed shoulder may be used with this crown.

## Materials

Some materials and supplies will, of course, have to be obtained, such as: (1) platinum foil; (2) instruments for adaptation of the foil to the die; (3) camel's hair brushes; (4) porcelain carvers; (5) a supply of porcelain powders and stains of the fusing temperatures suitable for the heating device at hand.

Precious metal posts are not required, although I prefer the 14 or 15 gauge iridio-platinum wire, the cost of which is not prohibitive in the amount needed for the average post.

## Operative Technique

1. If the fracture has been completely above the gum line, the preparation of the root for the crown is made as for a cast joint crown except that a shallow groove is added labiolingually on the gingival floor to assist in seating the finished crown. If the fracture is below the gum line, it may not be necessary to add this groove, for the irregularities of the fractured surface may sufficiently assist in setting the crown. In any case, the gingival floor, or at least a major portion of it, should be at right angles to the stress of the opposing teeth.

2. The root canal should be enlarged to accommodate a minimum

of 15 gauge wire, and preferably a 14 gauge wire, to a length equal to or greater than the length of the exposed portion of the crown.

3. If the fracture below the gum line is too low to permit a good tube impression, a temporary attached post crown should be fitted and set with temporary stopping, forcing the gum tissue away from the fractured root surface.

4. At a subsequent sitting, fractured irregularities may be smoothed, and a tube impression made with the protruding post in place in the root canal.

5. A wax bite, corrected with sticky wax to show a good imprint of the root surface, should be made, or a wax plug, showing clearly the root imprint with post in place, should be placed in position on the root and a plaster impression taken.

6. The approximate shape of the tooth should be drawn on a piece of paper and should show the mold, color, shadings, stains, and other markings that the finished tooth is to show. This is to be filed with the patient's record for laboratory reference.

7. The temporary crown is then set in place with temporary stopping and the patient is dismissed.

8. If the bite or impression is for an anterior tooth, it is well to include the corresponding tooth of the opposite side in the bite or impression.

Fig. 1—Stock crowns from which suitable mold and shade are selected.

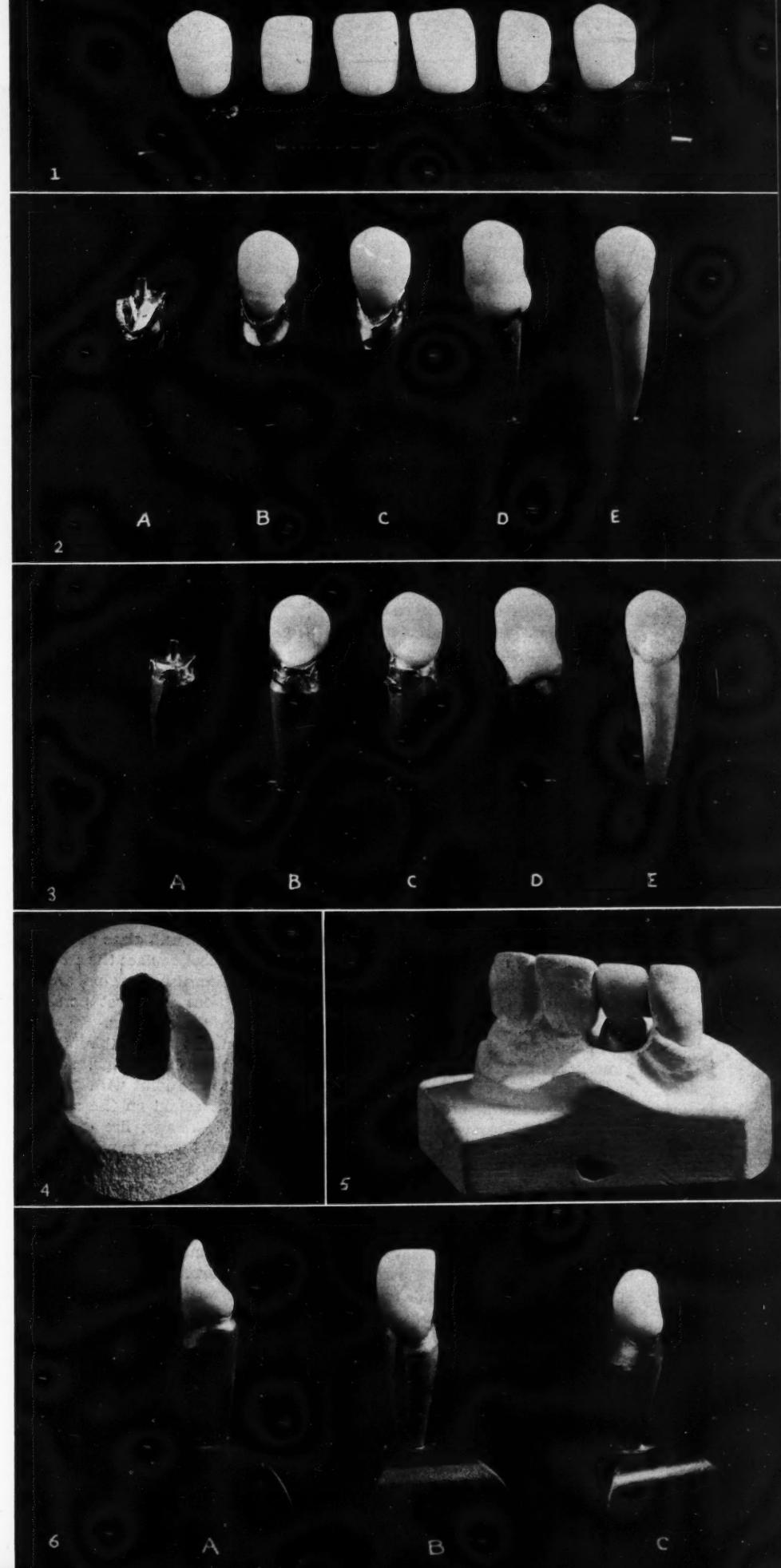
Fig. 2—Labial aspect showing step-by-step procedure. A, Swaged platinum matrix in position on die; B, crown ground to shape and position and waxed to matrix. C, After first application and bake of porcelain. D, Appearance after second bake, showing excess porcelain to control shrinkage. E, Finished crown properly contoured and glazed.

Fig. 3—Lingual aspect showing step-by-step procedure.

Fig. 4—Tube impression with post in place reinforced with plaster, ready for packing the amalgam die. Sectioned to show inside of tube impression.

Fig. 5—Plaster model showing articulated crown.

Fig. 6—Three types of cases acceptable for the baked joint detached post porcelain crown: A, with depressed labial shoulder below the gum margin; B and C, irregular fractures of the lingual portion of the stump below the gum line.



9. The shade of the crown is taken from the shade guide as for any other tooth or facing.

10. The operative technique is concluded following the laboratory procedure.

#### Laboratory Technique

1. The tube impression is now packed by vibrating the amalgam to place and extending the amalgam to form the root portion of the die.

2. The approximating teeth of the plaster impression are next packed with amalgam, the die waxed in place and the impression is filled with plaster.

3. If a wax bite has been used without plaster impressions, the opposite side of the bite is now filled with plaster.

4. After setting of the amalgam the die is trimmed and seated in the wax bite or plaster impression, the post being left in place. The die is then waxed in place with sticky wax, the shoulder joint being completely covered, and the bite or plaster impression is filled with plaster.

5. After the case has been mounted on the articulator, remove the die and clean with chloroform to remove the wax.

6. With a fine grit disc, smooth the plaster or amalgam of the approximating teeth, so that adequate contact with these teeth will be assured by the crown.

7. The crown is selected, ground to approximate position, and is ready to be waxed to the matrix.

8. Remove the post from the die by slight rotation and pull.

9. Either burnish or swage, preferably swage, a 1/000 platinum-palladium foil over the anatomic portion of the die, leaving an apron of about 3 mm. or 4 mm. extending over the joint margin.

10. Return the die and platinum to the articulator and articulate the crown in place.

11. With the smallest possible amount of sticky wax, attach some portion of the crown to the platinum matrix.

12. Remove the die and crown from the articulator, and vibrate porcelain of the gingival or body shade to place, leaving free the margins of the joint.

13. Remove crown, platinum, and post from the die, then by rotation,

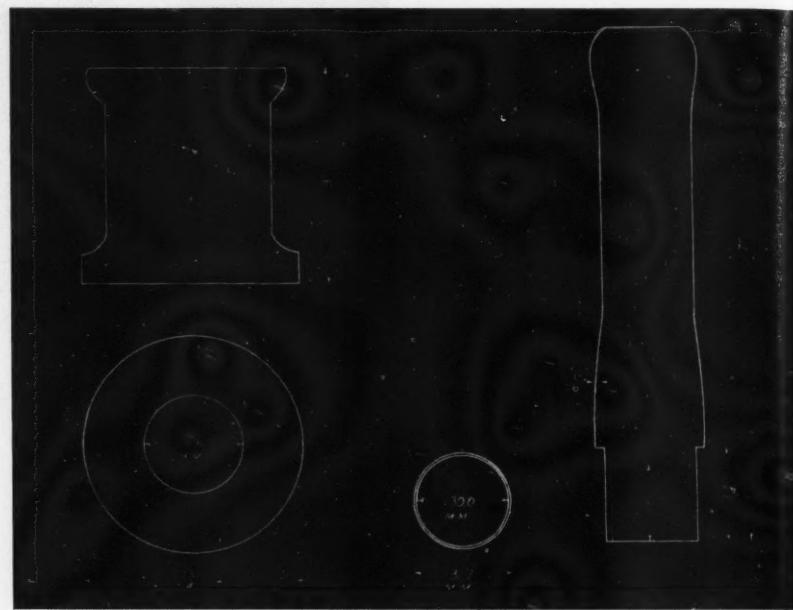


Fig. 7—Photograph of blue print of swager. Swager is made of steel and can be turned out in any machine shop or purchased from the supply house. Mouldine fills the cups. The die is covered with tissue paper before placing in the swager. (This is a heavy instrument and makes a satisfactory swager and one that is preferable to others.)

remove the post from the crown, and place the crown on the tray for firing. The tray should have a platinum post of a size to fit the post hole in the crown.

14. Heat the crown before firing to permit complete drying of the wet porcelain; then heat slowly for the first 600 to 800 degrees; increase heat to biscuit-bake the porcelain.

15. Biscuit-bake low-fusing porcelain at 1600° F. and glaze at 1700° F.

16. When cool, replace the crown on the die; re-burnish margins, and re-pack the joint with wet porcelain, leaving free the margins.

17. When this is fired (biscuit) and cooled, re-burnish margins; add wet porcelain to the joint with generous excess of porcelain on the apron to allow for shrinkage; fire to biscuit; cool, trim, and try in mouth.

18. If this is satisfactory, fire to glaze.

If the crown is ground to fairly close adaptation to the die, the entire biscuit-bake may be done at one firing in the furnace.

19. Remove the platinum matrix, and cement to place.

20. Staining is done best after the crown has been contoured and glazed.

#### Operative Technique Concluded

When the crown has been returned from the laboratory in its preliminary contour, it is then tried in the mouth and adjusted for gingival adaptation, occlusion, contact, contour, and the checking for stains and markings. If no special markings are required, it is a simple matter to match the gingival or body color of the crown and a single color powder is all that will be required.

If the crown is not suitable at this stage, such changes as are desired are made, and the crown is reglazed. The crown is then ready for cementation to the root.

#### Comments and Suggestions

It may require a little experimenting for the operator who does not have a porcelain furnace in order that the heating device may be tested to determine the time and temperature required for baking the porcelain. I would suggest that the dentist whose porcelain furnace or electric heating device will produce only approximately 1700° F. use the low-fusing porcelains and stains; otherwise, the

medium-fusing porcelains and stains would be more suitable.

For those who are accustomed to baking porcelain the detail given here is somewhat superfluous, but to those who have no experience in baking porcelain or who do not have a porcelain furnace, this description may be somewhat inadequate; consequently, some practice and experimentation may be required to complete this crown with ease.

The heating equipment used should be electrical and capable of producing at least 1700° F. The possibilities of the heating equipment may be determined by melting pure gold (melting at 1945° F.) or some gold alloy or solder with known melting range approximating 1700° F. or higher. The equipment should be timed from room temperature to melting point of the test material, so that the time factor may become a part of the firing of the porcelain until the operator can bake a biscuit, high biscuit, or a glaze with comparative certainty. If a pyrometer is attached, the timing is not so important, although it may

act as a safety valve, for even the pyrometer-equipped furnace. An interval timer should be used or an electric alarm clock. Accurate timing is essential because even a minute too long at high temperature may over-bake the porcelain.

#### Caution

The following specific details warrant particular attention:

1. There should be no undercuts at the shoulder joint, because the platinum matrix must withdraw easily. Even though the matrix may not be displaced in removing, strains in the porcelain may be created as the platinum is bent to pull over an irregularity. Undercuts should be filled with soft amalgam or modeling compound.
2. There must be absolute accuracy in placing the die in position in the bite or impression.
3. Slight discing of approximating teeth should be done to insure firm contacts.
4. Underbaking rather than over-baking is preferable to prevent destruction of porcelain and color loss.
5. Finish to natural glaze rather than by using superglaze or low-fusing glaze if porcelains used are of approximately the same fusing temperatures; otherwise, glaze with superglaze or low-fusing porcelain glaze.
6. Polish or contour with paper discs made for porcelain use and do not use stones.
7. Stain with porcelain stains of the proper fusing point, and if low-fusing stains are used, cover with an added glaze.
8. Begin firing slowly; allow wet porcelain to dry thoroughly, and permit the saturation of muffle temperature by the mass of porcelain; cool slowly.
9. Pack the porcelain with a brush and vibrate.
10. Do not be afraid to alter the contour, or shade if it does not suit.
11. An enamel bulge at the labial and lingual shoulder joint will help to protect the marginal gingivae.
12. Cleanliness is essential in porcelain constructions.

604 Medical Arts Building.

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## INFECTION OF DENTAL ORIGIN IN SOFT TISSUES OF THE HEAD AND NECK

*(Continued from page 17)*

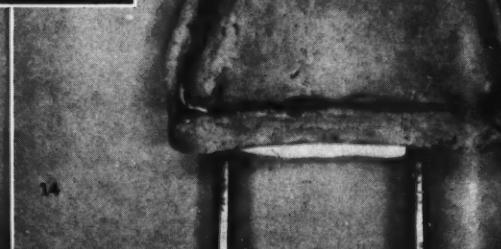
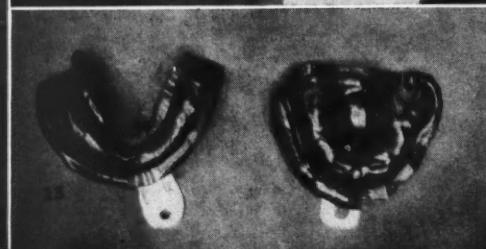
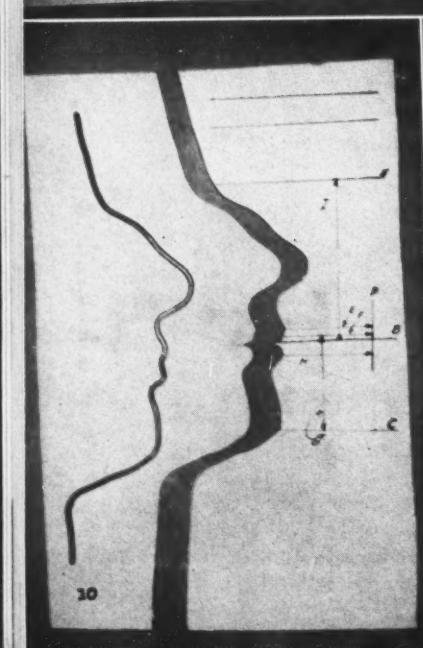
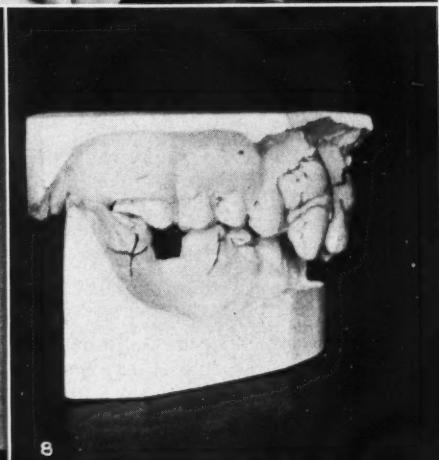
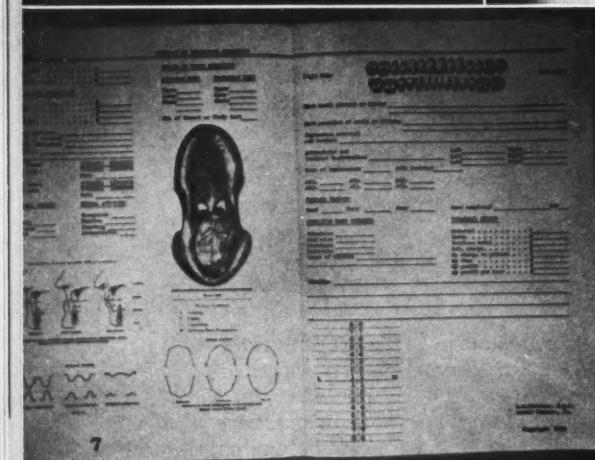
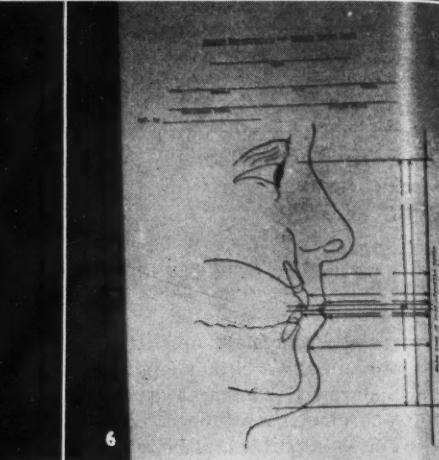
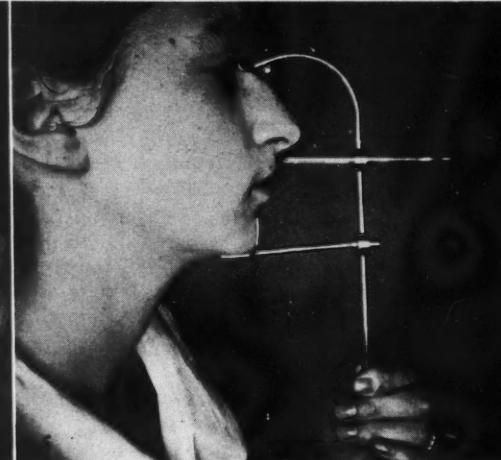
induration, and by the absence of disease of the lymph glands, though the cellular tissue surrounding them may be affected.

In a careful study of the condition, Ashhurst considered Ludwig's angina to be a clinical entity and he defined it as follows: "It is an acute inflammatory process involving the cellular tissues of the floor of the mouth and the submaxillary region of one or

both sides of the neck." Ashhurst admitted, however, that it may involve one or both sides of the neck and that other spaces may be coincidentally involved. In many of our cases of this type we have found the parapharyngeal and parotid spaces to be involved also, and perhaps the carotid sheath. The term should be discarded, and in the designation of an inflammatory process of the various spaces the case

in point should be described in reference to the fascial space or spaces involved. By so doing one will gain a clearer concept of the individual case. The treatment of Ludwig's angina, so-called, is the treatment of the space or spaces involved, as already detailed.

Jenkins Arcade Building.



# Full Denture Construction

L. S. FLETCHER, D.D.S., Castle Shannon, Pennsylvania

**PREEXTRACTION RECORDS** including photography, with facial dimensions, sufficient surgical preparation of the jaws, and individual rigid trays are important aids in full denture construction.

Preextraction records with facial dimensions are of little value at the time of insertion of an immediate denture, except in cases of a deformity, when they become invaluable, but they are helpful when reconstructing the immediate denture, or in duplicating the original one.

Fig. 1—Anterior view of face taken to show contour and angulation of lips, depressions, if present, at corners of mouth and sides of nose.

Fig. 2—Lateral profile to show lateral contour of lips and chin, and of cheek from corner of eye to middle third of the side of chin.

Fig. 3—Anterior profile of patient when smiling, taken to show how much of teeth is visible; the visible length of the anterior, and the number of posterior teeth; also to see how much gum tissue is visible. The amount of visible gum tissue is compensated for when the alveolectomy is performed, by removing the necessary tissue at the time of extraction, whether the case is to be constructed immediately or later. The importance of removing this visible tissue is clearly demonstrated when comparing Fig. 3 with Fig. 12, the latter being the completed case in an immediate insertion.

Fig. 4—Occlusion; angulation, and overbite of teeth.

Fig. 5—Dento-profile scale in position on the patient's face, ready to record facial dimensions on profile chart shown in Fig. 6.

Fig. 6—Outside cover of pre-extraction and denture record chart.

Fig. 7—Two inside pages of same chart.

Fig. 8—Study casts.

Fig. 9—The old technique of adapting a 14 gauge wire to the face as shown in Fig. 9 may be used if photograph and profile scale and chart are not used.

Fig. 10—Placing wire on a cardboard and cutting out a prosthogram. On this prosthogram facial dimensions may be recorded.

Fig. 11—Prosthogram with dimensional lines recorded thereon being held on patient's face.

Fig. 12—Patient with completed denture inserted.

Fig. 13—Snap compound impressions.

Fig. 14—Snap cast with outline of finished denture marked with pencil.

## Individual Trays

Poor adaptation of a denture to the oral tissues may be traced in many cases to the use of a poorly fitting tray during the impression taking. The more evenly the impression material is distributed over the tray, with not too much bulk, the better will be the impression. With a tray that fits well, such as a cast tray,<sup>1</sup> or the individual metallic tray,<sup>2</sup> the retention, especially of the lower, can be increased approximately 25 per cent. The tray can be made in about ten minutes after the snap cast has been obtained. A stock tray cannot be adapted as well. The metallic tray used with this impression technique may be substituted for the Atkinson technique and vulcanite tray. It will serve the same purpose, and requires several hours less to make it.

## Baseplate

Baseplates are lined with tin foil and reinforced with a bar before registering the bite. A more accurate registration will thus be obtained; the cast will be mounted on the articulator correctly, and there will be almost no distortion of the trial baseplate when setting up the teeth or when checking the set-up in the mouth. The excessive grinding of the teeth after vulcanizing or processing is due mostly to incorrect mounting of the casts on the articulator and not so much to movement of the teeth into the investment during this procedure.

## Tin Foil Technique

1. The adapted baseplate is removed from the cast; then, 1/1000 inch tin foil is burnished to the same cast, excess tin foil being trimmed away.

2. The impression paste is mixed and a thin coating smeared over the entire cast surface of the baseplate, then pressed firmly over the tin foil that has been adapted to the cast. The

pressure of the baseplate and paste against the foil will cause a far closer adaptation than can possibly be obtained with only the baseplate.

3. The baseplate is now reinforced with a metal bar as shown in Figs. 19 through 25.

## Selection of Teeth

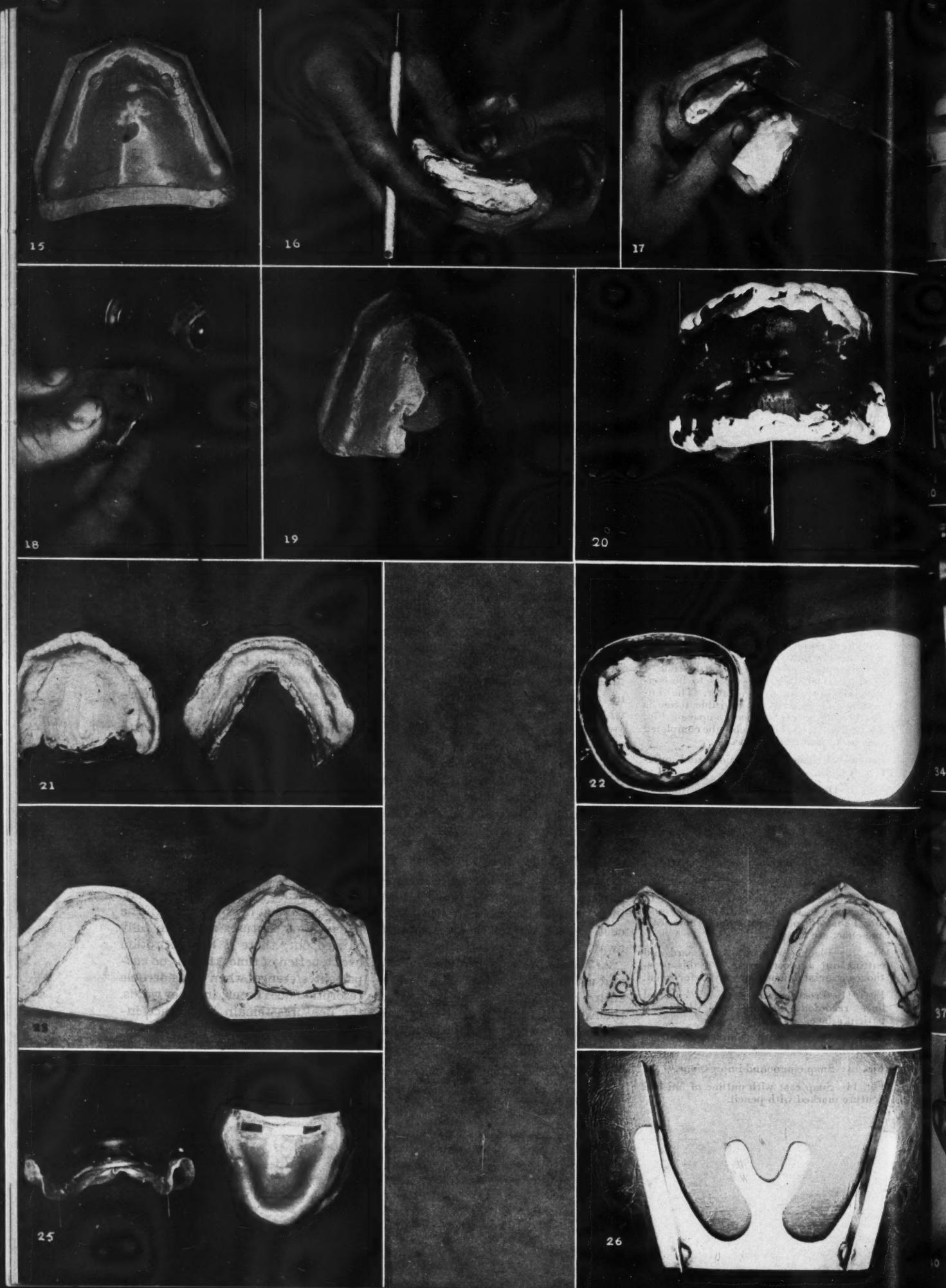
Whenever a functional change is made in Nature's plan, it is necessary to modify the form, so that it will function with the changed condition. The periodontist grinds natural teeth to eliminate cuspal or incisal interference; the orthodontist corrects malocclusion to prevent decay and cuspal interference; likewise the prosthodontist should select teeth that will in no way cause or develop cuspal interference. Toward this end, therefore, 20 degree upper trubyte and the French lower posterior teeth are used in most cases of full denture construction.

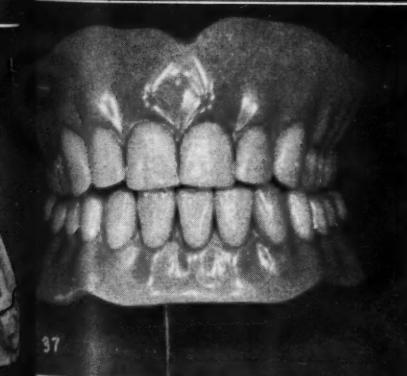
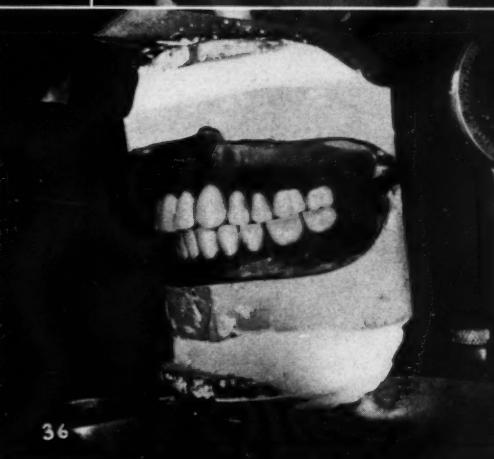
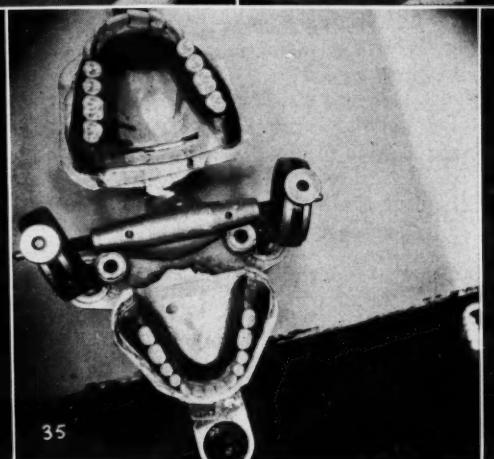
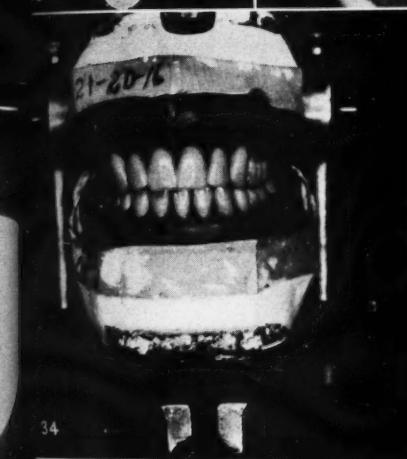
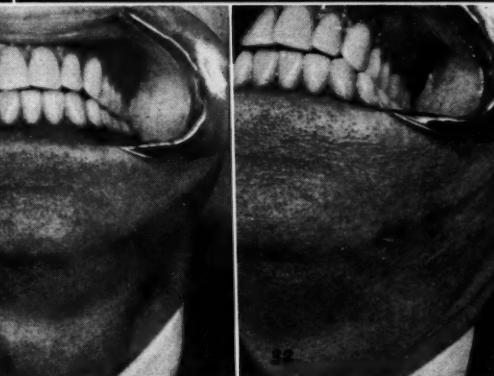
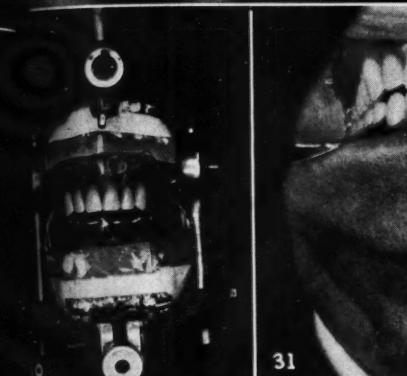
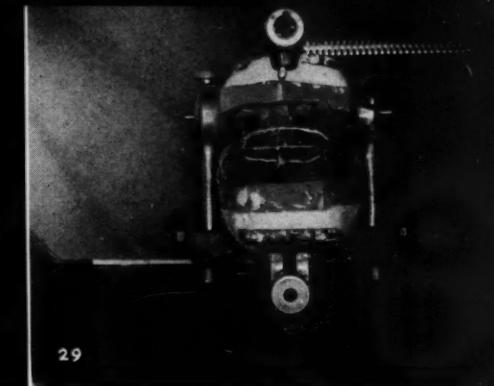
The elimination of the cusp tooth in both dentures helps to preserve the supporting tissues. With this selection of posterior teeth, only a minimum amount of spot-grinding is done while setting up the teeth. Final correction is done by having the patient do the milling-in with abrasive paste in the mouth. Individually milled occlusal rims also help to eliminate denture instability and trauma.

The modification in the selection of posterior teeth has helped to increase stability, utility, and comfort. This combination of posterior teeth requires an anatomic set-up. By modifying the posterior selection, patients can masticate better with less effort. The mechanical laws that govern the behavior of dentures are more fully carried out; there is less resorption over a period of time; there is no cuspal interference when considerable resorption does occur; in other words, the dentures remain in balance indefinitely. Cuspal interference has been found to destroy more alveolar process than any other mechanical factor dealing with denture construction.

<sup>1</sup>Fletcher, L. S.: Cast Individual Impression Trays, *DENTAL DIGEST*, 42:272 (August) 1936.

<sup>2</sup>Fletcher, L. S.: Individual Metal Trays, *DENTAL DIGEST*, 43:522 (November) 1937.





(Illustrations on preceding two pages)

Fig. 15—Baseplate adapted to snap cast.  
Fig. 16—Molten metal being placed on baseplate with a spatula and molded to place with thumb and finger.

Fig. 17—Metal being smoothed with warm soldering iron.

Fig. 18—Over-extension of baseplate and metal being trimmed away with a rubber wheel.

Fig. 19—Individual tray having been muscle-trimmed and post-dammed with compound, and one half of the impression completed with impression paste. Metal over baseplate is about 1 mm. thick. Baseplate is left attached to metal when completing impression. When employing Atkinson's technique, it is not necessary to make a vulcamite baseplate; one of these trays can be made in fifteen minutes and will serve the same purpose.

Fig. 20—Completed full upper and lower denture impressions as removed from the mouth.

Fig. 21—Same impressions separated.

Fig. 22—Left, impression boxed-in; right, base of impression reinforced with plaster.

Fig. 23—Completed casts. Outline on vault of upper cast is a groove cut into the cast about 0.5 mm. deep. This in turn will produce a beading of the same height on completed denture, which will add considerable to retention of denture. When employed in construction of immediate cases the denture will be serviceable, from a retention standpoint, for three or four years.

Fig. 24—Different areas of casts requiring consideration before completion of case.

Fig. 25—Posterior of upper and lingual of lower baseplate reinforced with a metal bar to prevent distortion while registering bite and setting up teeth.

Fig. 26—Occlusal plane guide.

Fig. 27—Occlusal plane guide having been placed between bite rims in mouth and side board placed against cheek to aid in paralleling occlusal rims to an imaginary line from base of nose to auditory meatus.

Fig. 28—Paralleling anterior portion of rims with pupils of eyes.

Fig. 29—Cast with bite rims mounted on articulator.

Fig. 30—Six anterior teeth set in wax ready for try-in in mouth to check length and form.

Fig. 31—Full wax set-up being checked in mouth.

Figs. 32 and 33—Working bite and balancing bite checked in mouth.

Fig. 34—Case waxed prior to investment.

Fig. 35—Occlusal view of set-up.

Fig. 36—Lateral view of set-up.

Figs. 37 and 38—Completed dentures; note extension of heel of lower denture.

Fig. 39—Protrusive bite in mouth of completed case.

Fig. 40—Patient trying to smile.

Figs. 41 and 42—Anterior and lateral view of patient with dentures inserted.

### Effect of Pressure

The direction of force against the ridge, when a patient is masticating food, I believe, is not as the tooth manufacturers say. The patient does not chew his food entirely by an up and down stroke, but by crushing and tearing the food, by sliding the teeth from lateral to centric. It is in this movement that the resultant force which throws dentures out of balance should be given careful consideration.

The force applied by the patient is mostly directed entirely off of the crest of the ridges, and its destructive effect is along the buccal periphery of the upper denture and the buccal, labial, and lingual peripheries of the lower denture.

### Vertical Dimension

Discomfort to the patient and destruction to the supporting tissue are often caused by carelessly opening the bite. There is no definite formula for this procedure in denture construction. Pre-extraction records with facial dimensions, therefore, become invaluable. If correctly recorded, then applied while constructing the bite rims, dentures can be constructed to the original vertical dimension; or, the vertical dimension can be increased if such a change is indicated.

If the patient was not seen before he became edentulous, the following procedure may be used to register the vertical dimension:

1. Measure the distance from the pupil of the eye to the upper lip line, and designate this distance by *a*.

2. Measure the distance from the base of the nose to the crest of the upper ridge. Call this distance *b*.

3. Measure the distance from the crest of the lower ridge to the bottom of the mandible and label this *c*.

4. Add *b* and *c* together and subtract the sum from *a*. The resultant will be the distance between the crest of the two ridges, or the vertical dimension.

Another method is to construct the rims to a height and length that will give about one eighth of an inch between the bite rims in the incisal region when the usual test words are pronounced.

As a third aid in determining the vertical dimension in edentulous cases, an arbitrary point may be marked on the median line of the upper lip just below the nose and another on the median line on the tip of the chin. The patient is asked to open and close the mouth several times, stopping the closure when the jaws reach a comfortable position.

The distance between the two points mentioned is then measured. When the patient is able to stop the closure a few times at the same position, this distance may be accepted as approximately the vertical dimension for this patient.

There are many ways by which to determine the vertical dimension. It is better to give the patient a closed bite, if in doubt, rather than an open bite.

### Comments

By the use of a rigid individual tray; by reinforcing the baseplate with a metal bar; by lining the baseplate with tin foil, and by carefully mounting the casts, all excessive grinding of the teeth is eliminated before or at the time of insertion, and unbalanced dentures will not be inserted.

In immediate restorations, the normal vertical relation and the proper length and height of the teeth with about the same cranial relationship must be maintained. In full denture construction, by the application of correct mechanics, we can assure attention to phonetics and natural appearance, and produce efficient function.

3745 Poplar Street.

## *The Editorial Page*

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IF AN AMERICAN PRESIDENT issued a ukase suggesting that after a certain date there was to be no white flour produced, no sugar refined, no candy manufactured in America, we would all send up the cry of dictatorship. We would say that our rights to consume what we chose were being infringed upon and the powerful interests—food manufacturers, processors, and refiners—would scream that they were being destroyed. If we are to be consistent, however, and follow the markings of science, we must recognize that white flour, refined sugars, and candies are destructive to the dental tissues. All investigators agree that nutritional factors—the lack of some food elements and the excessive presence of others—produce conditions that promote the development of dental caries. Whether the studies have been made on laboratory animals, or on primitive or civilized peoples, the observations are the same: The lack of minerals and protective foods and the excessive presence of carbohydrates seem to produce dental caries.

We cannot, therefore, safely let to chance the selection of foods by Americans. Caries cannot be controlled in school clinics by early dental care; by the educational material that is released through publications and radio programs. If we go back to first causes, we find that we must do something about the food habits of the American people and we must be prepared to change their mode of living. On the one hand, there are the vested interests, the manufacturers of foods; on the other hand, is the small group of scientists who would like the American people to have a different kind of dietary for their own good. In between are the millions of people who eat what is handed them. If the laboratory demonstrates that food is important to health and well-being and that proper nutrition is a protective factor against most disease, we cannot logically allow food manufacturing or distributing to be a matter of chance.

At the National Health Conference in Washington, the president of the American Molasses Company, representing capitalism, expressed his vigorous approval of the National Health Program. One wonders what he would have

said if someone had arisen to suggest that a national health program will require more than clinics and new hospitals and public health measures as these are now understood; that such a program will require an entire revision of American food habits; that molasses being a highly refined sugar, which helped in the degradation of the dentition of the Eskimos, for example, should be one of the first products curtailed. We wonder what the president of the American Molasses Company would have thought of a national health program—if it had had ramifications of this kind.

We wonder, too, what the farmers of America might say if their food products were graded qualitatively by the Department of Agriculture. If it is true that soil erosion and demineralization of the soil affects the quality of the food stuffs that are produced for direct consumption by man or indirectly through domestic animals, we find that farming itself can no longer be a laissez-faire occupation, but that the government, to protect the health of the people, must require qualitative food standards from farmers. A national health program to be complete should require reforms in agricultural methods, projects in soil conservation, changes in the manufacturing and distribution of foods. We wonder what those consumers groups represented in Washington last July—the farmers, the trade unionists, and others—would think of this kind of health program.

Science knows that there are out-and-out deficiency diseases and that dozens of other disease states are influenced by nutritional factors. It is not unlikely that the high morbidity and mortality rates in the lower economic groups are in part evidences of a qualitative malnutrition. The scientific literature is full of stories of the anemias, the diabetes, the nephritides, pellagra, scurvy, and dental caries—all produced by either the lack of certain food factors or the excess presence of others. Are social planners prepared to battle the vested groups of farmers, food processors, and manufacturers in order to bring the practice of human dietetics up to the scientific standards of nutrition?

## QUESTIONS AND ANSWERS ON

### WHAT IS NITROUS OXID and How Does It Act in the Human System?

Nitrous Oxid is described by Prinz in Dental Materia Medica and Therapeutics as "An inorganic compound which will not decompose in the lungs and will not enter into combination with the blood, but which is readily absorbed by the latter without entering into true solution and without affecting the hemoglobin."

Nitrous Oxid is carried by the blood stream to all parts of the body and all tissues are exposed to the same concentration according to the dosage administered. It does not form any stable compound with any tissue or substances of the body,

and it is eliminated in the same chemical form in which it enters the human system.

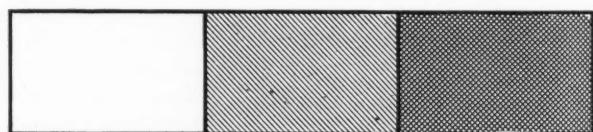
Anesthesia is produced by Nitrous Oxid in simple solution with the blood fluids displacing the Oxygen which ordinarily is carried to the nerve cells. Thus, the degree of anesthesia varies according to the dosage of Nitrous Oxid in relationship to the intake of Oxygen. For analgesia the dosage is controlled so that the intake of Oxygen is sufficient to sustain consciousness and maintain reflexes which are almost normal.

### WHAT IS NITROUS OXID ANALGESIA?

Analgesia is the first stage in the induction of surgical anesthesia. It is characterized by a relief from pain while consciousness is retained. To the patient its manifestations are a pleasant languid feeling and a sensation of warmth and well-being. The induction is pleasant, resulting in a soothing effect rather than one of depression. Recovery from analgesia is complete in a few minutes, leaving the patient refreshed and relaxed.

The progress of anesthesia can be grouped in

three stages, i. e. analgesia, excitement, surgical anesthesia. The relationship of analgesia to anesthesia is shown in the following chart.

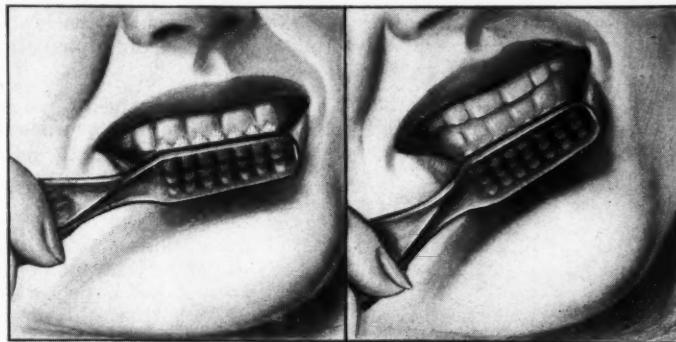


### Under the Influence of Analgesia is the Patient's Consciousness Sufficiently Acute for Cooperation with the Dentist?

Under analgesia consciousness is retained and the patient is aware of everything that goes on around him. Senses of sight, hearing and speech remain almost normal. Thus, while pain is ob-

tended, the patient has control of all motor reflexes and is in the ideal state for cooperation with the operator.

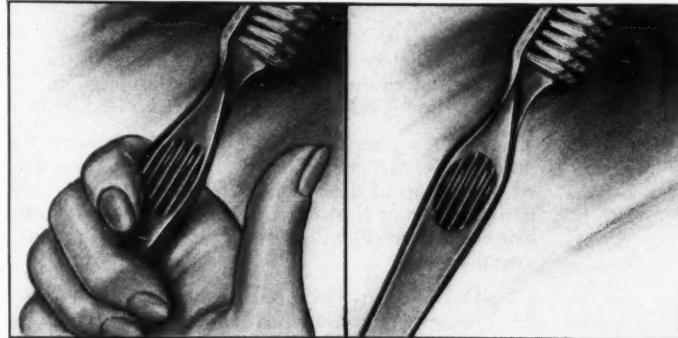
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Massages the Gums

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- (2) NOTE the small brush head with bristle knots widely separated for cleansing penetration to all five tooth surfaces. Even contour of bristle levels make brushing and massage safe.



- (3) LOOK at the uniquely different handle twist. The patient naturally and automatically places brush correctly for proper massage while brushing. The twist causes the bristles to point towards the teeth and not towards the gums.
- (4) NEW—the non-skid thumb-rest for balanced grip and easy manipulation.

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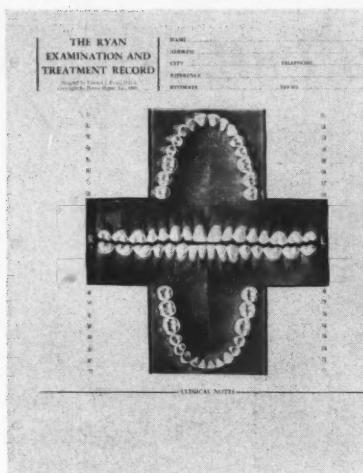
**BRISTOL-MYERS COMPANY**

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NEW YORK, N.Y.

# Suggestions for the use of The Ryan Examination and Treatment Record



## TYPES OF PENCILS

Yellow .....	Mongol No. 867
Gray .....	Mongol No. 819
Red .....	Mongol No. 866
Blue .....	Mongol No. 865
Yellow .....	Castell No. 40
Gray .....	Castell No. 57

Mongol pencils are made by Eberhard Faber; Castell by A. W. Faber.

## SUGGESTED SYMBOLS

Each dentist may develop his own system of symbols but the following specific markings have been found simple and adequate:

**Soft Lead Pencil**—(a) Porcelain fillings are indicated by a pencil outline.

(b) Porcelain jacket crowns and bridges are shown by cross-hatching with lead pencil across the corresponding tooth or teeth on the chart.

(c) Missing teeth are blocked out with a soft lead pencil.

(d) Abrasions are represented with soft lead pencil.

**Blue Pencil**—(a) Cavities are indicated with blue pencil.

(b) Advisable restorations are demonstrated with blue pencil.

**Red Pencil**—(a) A red line is used to indicate the presence of a root canal filling.

(b) A red outline shows the presence and position of an impacted tooth.

(c) Red pencil is used to represent pulp involvement.

(d) A red "X" is made across a tooth to indicate that its extraction has been advised.

(e) Pyorrhoea pockets are represented in red along the crest of the alveolar ridge (and a notation is made at the bottom of the chart if extensive gingivitis is present).

1. The Ryan Examination and Treatment Record may be had in pads of fifty charts each. These pads fit conveniently in a standard 9½ by 11½ inch loose-leaf notebook which may be purchased at a five-and-ten cent or variety store.

2. Alphabetical dividers may be made by using a ten cent package of plain white paper of the same size as the charts with holes punched at the same distances, and a fifteen cent box of alphabetical index tabs. The holes are reinforced.

3. It is a good plan to keep a blank sheet of paper between the charts to prevent possible smearing of crayon or pencil markings; but this is not essential.

4. A fresh pad of charts may be kept ready for use in back of the notebook of active records.

5. The various types of restorations and their location in a particular mouth are shown with the use of polychrome pencils—gray, for amalgam; deep yellow, for gold. White pencil does not show up very well; consequently, porcelain may be indicated with soft lead pencil outlines or cross-hatching.

6. Spaces provided beside the quadrants with numbers corresponding to the teeth permit special notations concerning each tooth. As treatment progresses the blue markings indicating needed dentistry are erased, and the nature, location, and date of placement of each new restoration are recorded. Additional clinical notations are made if necessary in the space provided for that purpose below the chart itself.

7. It is essential to be consistent in any system of symbols or markings developed. To insure consistency, it is well to have a key page in the front of the notebook.

8. The exact record of conditions found in the average patient's mouth at the original examination can be completed in fifteen or twenty minutes, and the time it takes to keep a chart up to date is negligible.

9. When a chart is completed the necessary data (name, address, telephone, reference, estimate, and terms) are typewritten in the spaces provided at the top of the record. The date of the original examination is also recorded in order that the treatment dates (as shown in the quadrants at the sides of the chart) will be recognized as subsequent to the date of the original examination.

10. Provision is made on the back of the chart for bookkeeping records. This is merely for the convenience of dentists who wish to keep all records together, but may be ignored by dentists who have a satisfactory bookkeeping system which they need not and do not wish to discard. The Ryan Examination and Treatment Record may be employed as an additional or supplementary record to any established method of record-keeping dentists may have.

11. Although the Ryan Examination and Treatment Record was designed for the dentist's own convenience in his practice, the charts have been found to have a definite informative value in explaining conditions to patients. The charts are also particularly helpful in reporting dental conditions of patients to cooperating physicians.

THE DENTAL DIGEST, 1005 LIBERTY AVE., PITTSBURGH, PA.

Here is the dollar. Please send me a pad of 50 Ryan Examination and Treatment Record Charts.

Dr. \_\_\_\_\_ Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

(Or please use coupon on page 48)

If you have not ordered  
your charts, clip the cou-  
pon, and mail with a dol-  
lar bill.

## DENTAL MEETING

# Dates

Eastern Dental Assistants Society, regular monthly meeting, 145 West 57th Street, New York City, January 25.

Dallas County Dental Society, midwinter clinic, Hotel Adolphus, Dallas, Texas, January 30-February 1.

Greater Philadelphia Annual Meeting, Benjamin Franklin Hotel, Philadelphia, February 1-3.

Chicago Dental Society, midwinter meeting, Stevens Hotel, Chicago, February 13-16.

The Dental Graduates of the Class of 1919, Northwestern University, Chicago, Illinois, will hold their Twentieth Reunion at the Stevens Hotel, Chicago, during the Midwinter meeting of the Chicago Dental Society, February 13-16. O. W. Silberhorn, Chairman, A. H. Harris, Publicity Chairman, 603 Main Street, Evanston, Illinois.

The 1939 convocation of the United States of America Section of the International College of Dentists will be held at the Stevens Hotel, Chicago, Sunday evening, February 12.

Five State Post Graduate Clinic, eighth annual meeting, Mayflower Hotel, Washington, D.C., March 5-9.

American Association of Orthodontists, thirty-seventh annual meeting, Kansas City, Missouri, April 17-20.

New Jersey State Dental Society, annual meeting, Ambassador Hotel, Atlantic City, April 19-21.

Pennsylvania State Dental Society, seventy-first annual meeting, Yorktowne Hotel, York, Pennsylvania, May 2-4.

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strength. As a wet dressing, saturate a cotton pledge or gauze pad with the Solution, full strength or diluted with two parts of water.

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Every bottle of Ames Cement Liquid contains more than enough liquid to mix one bottle of the cement powder.

This excess of the liquid is provided as a safeguard against any change which may occur in any cement liquid during normal usage, due to exposure to air.

As the amount of liquid in the bottle decreases, the effects of any change become more evident. So Ames provides enough more liquid—twice the required quantity in Ames Copper Cement—to assure satisfactory results for the entire bottle of powder.

When all the powder has been used discard the excess liquid. It is not intended for use and is provided solely for the purpose of enabling the dentist to obtain the best possible results in each and every cementation. The Ames dropper closure is another safeguard against change in the liquid.

Thus Ames assures to the profession the maximum advantages of Ames superior quality in each and every case. Ask your dealer for Ames Cements or write The W. V-B. Ames Company, Fremont, Ohio.

# AMES DENTAL CEMENTS

### NOTES ON THE

## Cuff

December 1: Following the practice of popular modern radio programs, let us ask our audience to answer a few questions: Dentists, do you know what "buccal cacosmia" is? Have you ever encountered it in your practice? Have you ever experienced it yourself and your best friends would not tell you? What drug, if any, have you used for it? Or do you make some kind of dental restoration to correct it? If you don't know what it is (and I did not until I read an article from *Presse Médicale*), "buccal cacosmia" is bad breath, or, to put it in the euphemistic language of the advertising copywriters, it means "halitosis." Sannarelli, the author of this article, believes that the oral streptococci acting upon carbohydrate ingredients, produce acid-like elements that retard the growth of putrefactive organisms. If carbohydrates are lacking, the bacteria of putrefaction become predominant and in the presence of protein particles, malodorous conditions are produced. The author believes that *fetor oris*, to use another euphemism, is entirely a local condition, produced by putrefactive organisms operating on the protein molecule. So much for buccal cacosmia.

December 5: When a health columnist classifies dental caries as a disease, that is news. Most of the health columns are written by physicians, some of them in practice, a few are swivel chair doctors, and a few, like old Doc Brady, are chaps who know little about medicine. Doc Brady is the boy who says that dentists should be called dentors. Nobody has ever paid much attention to him. The health column in the *Chicago Tribune* is written by the Dean of Northwestern University Medical School. In an excellent article, "Neuralgia May Come from the Teeth," Doctor Cutter says that dental decay is a disease, and further, that "nine out of ten cases of aching of the face, head, and neck regions arise within



# ESTHETIC



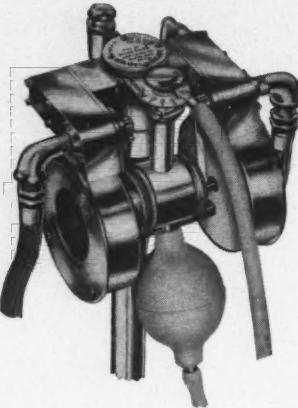
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the mouth or neighboring parts, the teeth particularly."

*December 7:* Edward Hatton, the pathologist and Daniel Storemont, a physician, speaking before a dental group, express their concept of focal infection. Hatton says that the concept of focal infection is a principle of medicine, no longer a theory or an hypothesis. The test of time, the application of the principle of focal infection by the practitioner at the chair and at the bedside have proved that this is a biologic principle; that organisms held localized at one spot may send off products into the blood and lymph streams to distant parts, there to reinfect other tissues. Hatton, in speaking about the one-time craze of removing teeth to cure neuroses and psychoses, said, "Those who extract teeth to cure insanity are equal in their folly to the persons suffering from the malady."

Daniel Storemont warned dentists that in the case in which there is both a tonsillar infection and a dental infection, the tooth should be removed first, because (1) the tooth is more peripheral and approachable, and (2) the tonsil is a lymph defense tissue which may aid in the protection of the body from organisms set free from the dental infection. Storemont mentioned that in focal infection the blood picture shows in the white count a low polymorphonuclear and a high lymphocyte count.

*December 10:* Many articles have been written on how to build a dental practice, a few on how to maintain a practice, but none that I know of on shortcuts to the painless death of a dental practice. I would like to see somebody write a realistic story on techniques for the destruction of a dental practice, describing all the things we do inadvertently to destroy a practice. Sometimes when dentists speak of their patients and their practice, one would think they were speaking of serfs and chattels. A dental practice is fluid. People flow in, stay a while, and flow away. The most successful practices are the ones in which the "staying a while" is accomplished for a rather long while. When a dentist begins to go down hill, the egress of people is swift. It is a truism that people love to follow the leader. The world's champion today is a bum tomorrow. The dentist on the top of the heap today can be a

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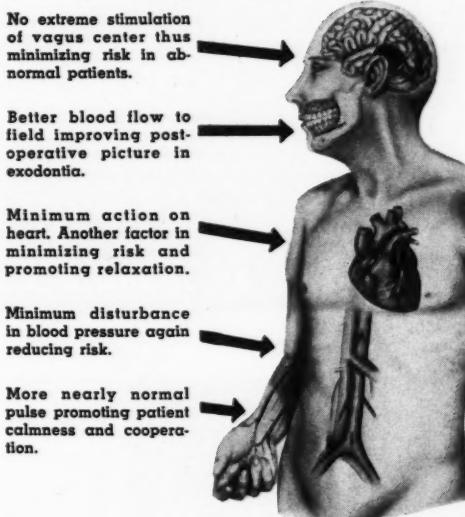
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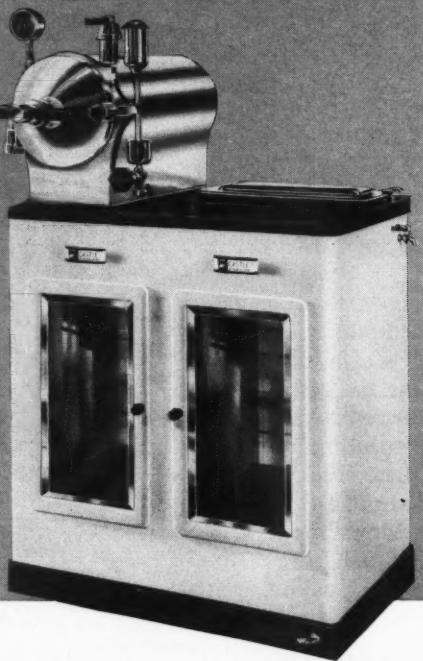
  
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miserable failure tomorrow. People judge by intangibles. A frayed curtain offends a woman patient more than a bad margin on an inlay, about which she knows nothing. A fastidious person dislikes the taste of tobacco on a dentist's fingers more than an evil-tasting drug which he may apply to the mucous membrane. I would dislike to be Dale Carnegie-ish, but a dental practice is made up of people who have dental lesions, not dental lesions swinging free in space, detached from human personalities. One of the surest techniques for the destruction of a practice is not to let the patient have any idea of what you are trying to do or of his obligation in the transaction. Dentists are prominent among a small group of producers of service who expect people to accept sight unseen and price unknown. A good test for each of us to apply is this: What would I want done to me if I were on the other end of the dental bur, the receiving end? This question assumes that dentists do occasionally get on the other end of the bur which, after seeing dentists at conventions, we sometimes doubt.

December 12: I am afflicted with a squirming *derriere*. I can't sit through double feature pictures or sit long on a hard chair at a dental meeting; but tonight L. M. Waugh showed beautiful colored pictures of his studies of the Eskimo. The pictures lasted for two hours and a half and all of us were able to keep our derrieres firm on the chairs without squirming. Waugh shows that the Eskimo enjoys good health as long as he is untouched by the white man's world. The missionaries may have brought the Word to the Eskimo but with it he brought molasses, white flour, and dental disease. So long as the Eskimo ate his fats and proteins raw, despite the absence of fruit, grains, and vegetables, his index of dental disease was low.

Ordinarily we do not regard caries as an acute pathologic process; but Waugh demonstrates that caries can develop within six weeks following the consumption of sugar in the diet of the Eskimo. Other investigators, notably Price, have likewise made this observation many times.

December 19: Even the scientific literature from Europe reflects the dreadful autumn days when war was so imminent. The president of the



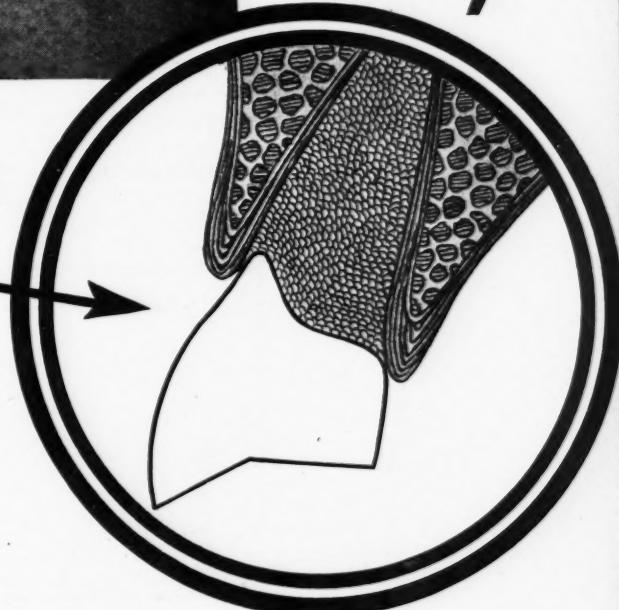
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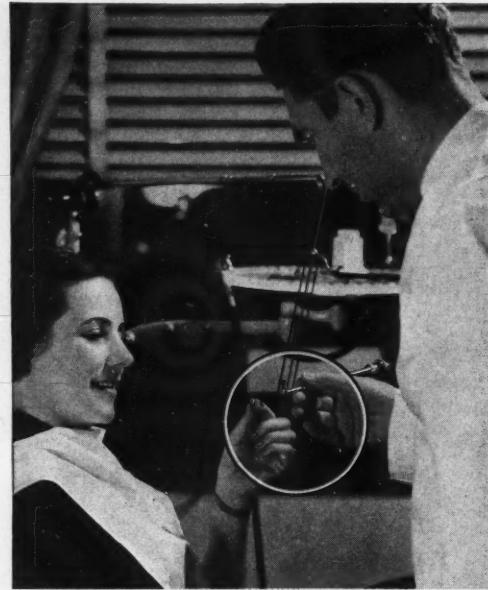
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Section of Odontology of the Royal Society of Medicine, one month after Munich, gave an address, "Jaw and Facial Injuries in War-Time." He predicts that in a future war the medical corps will be called on to treat not alone military casualties but injuries among the civilian population. War will no longer consist of charging cavalry and fighting in the trenches with a No Man's Land between. It will be a war of air-raids with women and children among the casualties as well as men in uniform. Arthur H. Parrott in this address emphasizes the need for the training of the dental corps and dentists in

civilian practice for war-time emergencies.

Most of the pictures that we see of the wars in China and Spain show the children and women among the victims. It is horrible to comprehend this destruction of life in metropolitan areas. With the new machines of war the facial injuries are appalling. Here in this country we are likely to think of war as something detached from us, but when we pick up a scientific publication of our colleagues in a European country and see them preparing their lives for these horrors, we realize how fortunate we are in our comparative isolation.—E. J. R.

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